

The Iron Age

A Chilton Publication

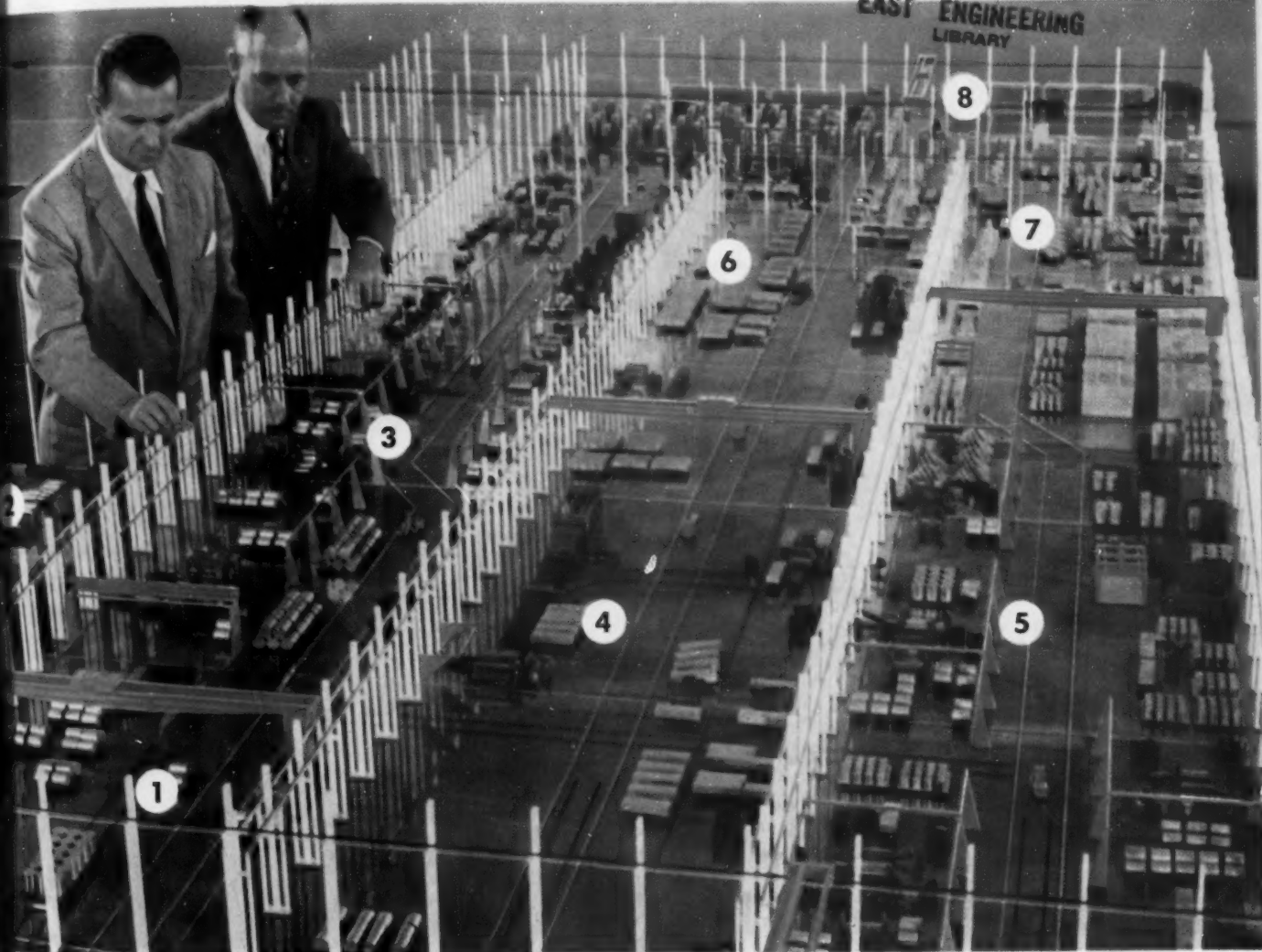
Salute
to the
West

See page 117

UNION MICHIGAN

THE NATIONAL METALWORKING WEEKLY • NOVEMBER 25, 1954 NOV 26 1954

EAST ENGINEERING
LIBRARY



The model shows: 1. Coil Storage 2. Machine Shop 3. Rolling Mills 4. Flat Sheet Processing 5. Coil Processing 6. Sheet Inspection 7. Coil Inspection 8. Shipping

Another major expansion to provide even faster, more efficient service

ABOUT the first of the year we will start construction of a new multi-million dollar sheet and foil rolling mill, located near Ravenswood, West Virginia.

This new plant will provide even faster and more efficient service to our customers of long standing in the mid-West and East and will help to develop additional aluminum sheet and foil users in these areas.

This expansion, which will greatly increase the availability of our fabricated mill products, is another major step in the continuing growth of Kaiser Aluminum. In the past three years, we have more than doubled our production capacity and we now have the capacity to produce

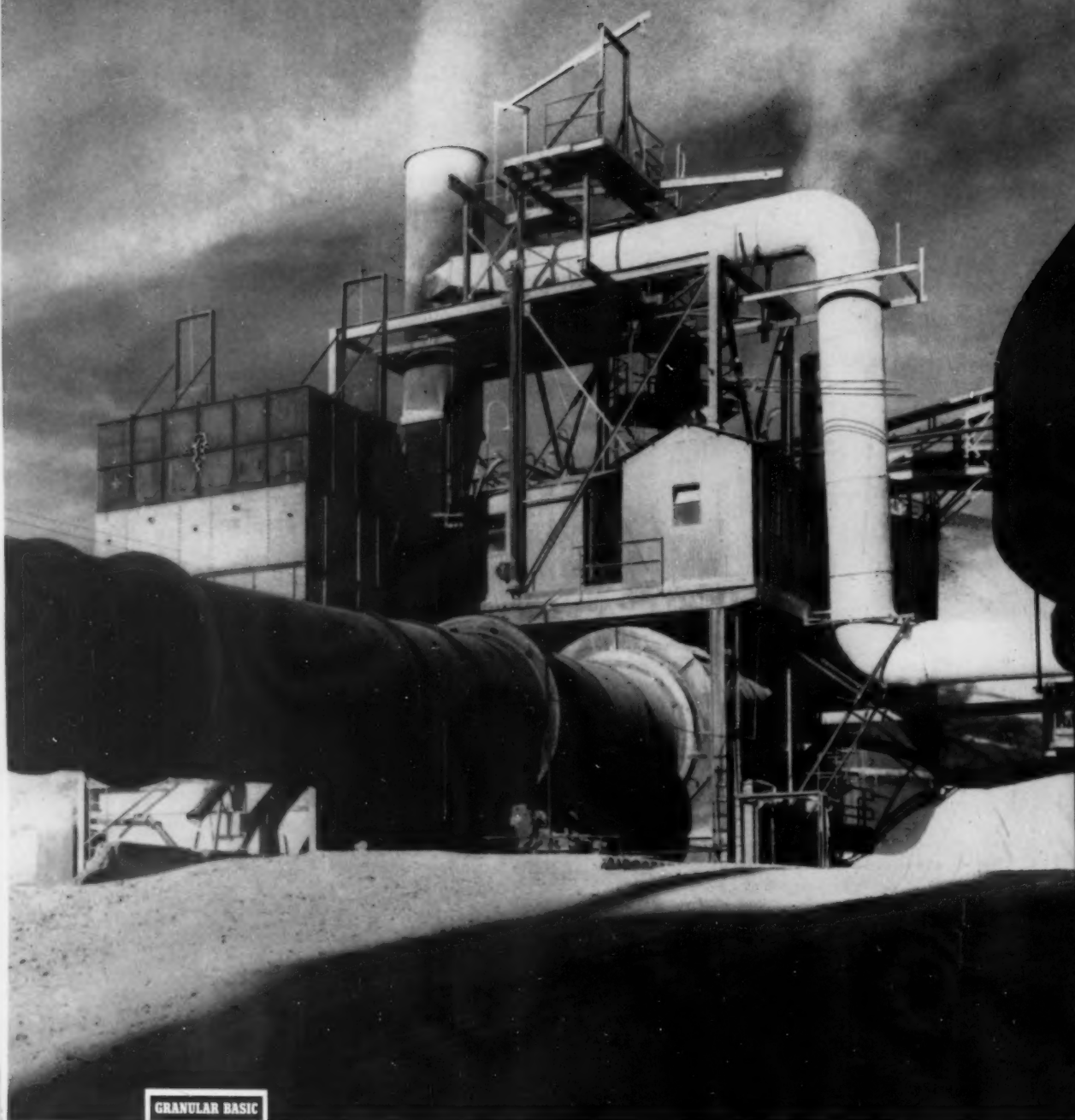
close to 30% of all the primary aluminum made in this country.

As the nation's fastest growing major producer of aluminum, we are proud of the part we are playing in the most vital and exciting of all American industries today. Kaiser Aluminum & Chemical Sales, Inc., General Sales Office, Chicago, Illinois.

Kaiser Aluminum

Setting the pace—in growth, quality and service

400-FOOT MAGNESITE KILN — GABBS, NEVADA, WORKS



Four different types of granular magnesia refractories are produced in this kiln—each serving specific applications. Selective mining, air fluidized blending, and briquetting insure uniformity of composition in all four dead burned magnesite products.

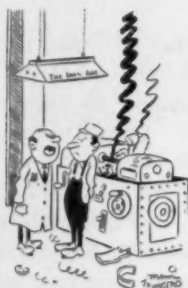
BASIC REFRACTORIES INCORPORATED CLEVELAND 15 OHIO

dear editor:

Likes Cartoon

Sir:

We would appreciate receiving 12 tear sheets of the cartoon on p. 117 of the Oct. 14 issue of *IRON AGE*. C. J. Wiegel, District Manager, Braeburn Alloy Steel Corp., Braeburn, Pa.



"We get Bauxite from British Guiana, Chromite from South Africa, and Cobalt from Rhodesia, then you come along from Brooklyn and turn it into scrap!"

Tool Life

Sir:

Please refer to your Nov. 11 newsfront "A Better Guide to Tool Life," setting forth that cutting temperatures and forces are quite important. Could you give us a reference to this as we are interested in it. W. W. McKaig, Cumberland Steel Co., Cumberland, Md.

A technical article on this subject may be found in our Nov. 18 issue, p. 156. Further information may be obtained from Mr. E. A. Loria, Staff Metallurgist, Crucible Steel Co. of America, Pittsburgh, Pa.—Ed.

Save Heirs Money

Sir:

Will you please forward two tear sheets of the article "How to Save Your Heirs Money" published on p. 74 of the Oct. 7 issue? J. R. Driskell, Purchasing Agent, Steel & Forgings Section, Allis-Chalmers Mfg. Co., Milwaukee.

letters from readers

Correction

Sir:

Please refer to p. 118 of the Nov. 4 issue and note that there is a rather serious error in the second sentence of the final paragraph of that portion of the Atlas Steels article referring to Hi-Head heating. You will note that the sentence states that the output would be about 30 lb per sq ft of hearth area. The output should be 330 lb per sq ft of hearth area.

If you will refer to p. 147 you will note that the correct furnace capacity is also stated at the end of the copy in our advertisement. It is quite unfortunate that this typographical error occurred in the article as the reader who does not check through the calculations previously given would definitely be left under a misapprehension.

If there is any possible way for you to correct this misstatement, I think it would be in order to do so as soon as possible. S. M. Stoler, Asst. to Vice-President, R-S Furnace Corp., York, Pa.

Ultrasonic Testing

Sir:

May we ask you to kindly send us tear sheets from the May 13 issue of the article on pp. 117-120 entitled "Ultrasonic Testing Lowers Forging Production Costs." Eli Sammett, Loewy Construction Co., Inc., New York.

Double Melting Technique

Sir:

Kindly forward two tear sheets of the article "Double Melting Technique Improves Homogeneity and Purity of Zirconium and Titanium Ingots." This article appeared in your Sept. 23 issue and was written by G. L. Miller of Murex, Ltd. H. A. Anderson, Sales Development Engineer, Carborundum Metals Co., Akron, N. Y.

FREE!

ULBRICH
Stainless Steel
Strip calculator
takes the guesswork
out of buying!

SPECIALISTS in
small orders of Strip,
flat wire and other
stainless steels — a foot, a pound
or up — converted to your exact
requirements

The BIGGEST little Converting
Mill in the country wants you to
have its copyrighted stainless
strip calculator.

Example: Your engineers want 1000 ft.,
.062" gauge, 3/8" wide. What **WEIGHT**
will you order? Calculator gives quick
answer — 188 lbs.

For free calculator send
your name on your letter-
head or on the margin of
this page to:

ULBRICH
Stainless Steels
WALLINGFORD 1, CONN.
Phone: Wallingford 9-7771

HOW MARVELLUM

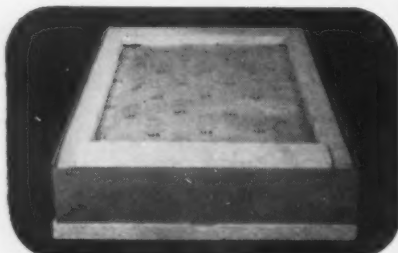
vpi®

WRAP

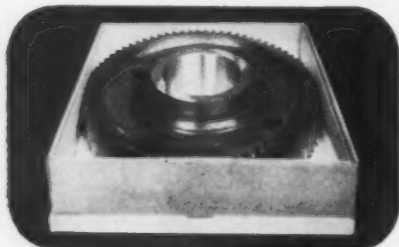
Speeds Assembly of Diesel-Electric Locomotives



Part arrives at assembly plant in steel-trapped skidded carton ready for stand-by storage.



Removal of carton top reveals rust-preventive VPI cover sheet held in place by top blocking.



Gear, on bottom sheet of VPI paper, is clean, bright and ready for immediate installation. No messy, time-consuming degreasing delays the assembly of General Electric diesel-electric locomotives.

In shipment and storage, Marvellum VPI Wrap positively protects parts against rust. A special coating on the paper vaporizes and forms an invisible protective film around the item packed, preventing corrosion. Wherever prevention of rust is a factor, you can save time and money with VPI. To get all the facts about this revolutionary protective wrap, write for our fully descriptive booklet and generous VPI sample. Our technicians will be glad to discuss corrosion problems peculiar to your plant.

Marvellum VPI Wrap is made in compliance with Military Packaging Specification MIL-P-3420.

The MARVELLUM COMPANY
2 Appleton St., Holyoke, Mass.

fatigue cracks

by William M. Coffey

Inside the Iron Age

Because the editorial department assigned us to this column and because we have never been unconfining with joy about the arrangement (as our 23 loyal readers by this time have certainly ascertained) we have appointed ourselves as a one-man committee to "get editorial." So for some time we've been undercovering the editorial department.

The most vulnerable place to hit any editorial department is in its "prediction of things to come" column. In your ffj this is called "Report to Management." And we watch this baby like a hawk. We are sorry to report, however, that the BIG BOLD PLAN is back-firing. The boys are just too good. Take "Report To Management" in the April 15, 1954 issue. This issue is typical (much to our sorrow). Let's see what they said and how many bells rang seven months later:

Report said, "Watch for a significant business upturn in September." (In the face of general pessimism). *What happened?* A distinct upturn came in September and is continuing.

Report said, "Construction is booming, will even top 1953." *What happened?* Current Dodge Reports show the boom is still booming and 1954 will top 1953.

Report in discussing inventories, said, "stocks will be where firms want them by September." *What happened?* Industry is reordering. Witness steel production up 31 pct since mid-August; inventory cut-back has stopped.

Report said, "Marriages and births are continuing at high rates." *What happened?* Latest official dope points to an all-time record baby crop of 4.1 million this year and, of course, a proportionate number of marriages.

Report said, "profits won't show

a severe dip . . . will slip, but just a mite." *What happened?* The National City Bank's current survey of 719 leading companies shows only a 1 pct drop in profits, third quarter of this year compared to third quarter of last year.

Report said, "Automakers will be marketing new or completely restyled '55 models." *What happened?* Does anybody doubt it—now?

You can see this plan isn't working. With the editorial department continuing to keep your ffj "the most powerful industrial magazine in the world" we haven't a chance. We'll go back to printing lousy jokes, misspelling words, getting copy in late, and so forth.

Inkidentally, now that you know how savvy these boys are, go back and re-read Tom Campbell's "Business: Things Look Good for 1955," which appeared last week. One of Tom's personal reports. We will inspect it with confidence a year from now.

New Puzzler

This is a little problem in solid geometry and spatial visualization which Mr. Leonard Bassis, Hi-Shear Rivet Tool Company, Los Angeles, says "could be the straw that breaks the camel's back in helping to relieve you of this column." Mr. Bassis must be an exceptionally fine fellow.

A perfect cube, edge of unit length, is painted green. The cube is oriented so that a plane saw cut is the perpendicular bisector of the diagonal line determined by any two extreme corners (if held by any two extreme corners, the cube could be rotated freely about the diagonal line). What are the shape and dimensions of the white saw-cut surface?

Restriction: No solid objects approximating a perfect cube to be used as an aid in visualization. Observing this restriction, 15 minutes is good time for a solution.

Hot Extrusion: Automation Next Step

Plastics: Auto Use Expanding

Inventory Juggling vs. Recovery

Use Resin-Impregnated Wood

Steel Warehouses Increasing Rapidly

Jet Fighter Will Have Magnesium Frame

November 25, 1954

Plan Four Door Hardtop for '55

Appliance Sales to Weight Electrical Load

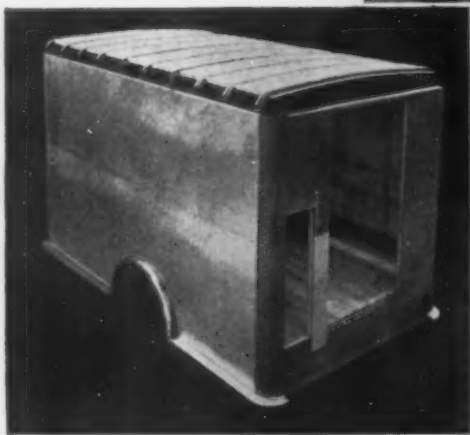
V-Particles: Do They Hold Matter Together?

Zirconium Successfully Hot Extruded

Higher Prices for Scrap Anticipated

Higher prices for steelmaking scrap may be anticipated despite consumer resistance which has recently shaved prices in some areas. Economic forces which have been moving prices up are still very much alive. These include: Higher domestic demand because of higher steelmaking rate, decline of scrap gathering facilities, exports.

Panels and roof for this Nabisco truck body were fabricated from Electro Paintlok by McCabe-Powers Auto Body Co., St. Louis, Mo.



IF YOU PAINT ON STEEL this may deliver an idea to you

For National Biscuit Company, customer attraction starts on the street. Therefore, lasting paint adherence, long service life and attractive appearance are extremely important on Nabisco delivery trucks.

To obtain these results, even under extreme weather conditions and hard service, Electro Paintlok is used for Nabisco truck bodies.

Electro Paintlok is the zinc plated steel sheet that is chemically treated to take paints, lacquers, synthetic enamels — and hold them for years.

And, even though the painted surface should become scratched, the tight zinc

coating guards against underfilm corrosion and creeping rust.

Republic Electro Paintlok is easy to fabricate, too. The tight zinc coating will not crack, peel or flake during normal fabricating operations. Surfaces require no pre-etching. They are preconditioned for painting.

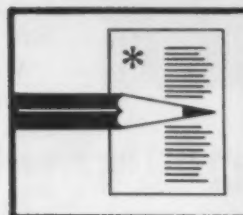
Get the full story on Republic Electro Paintlok for your fabricated steel products that need to look better longer. Write:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Dept.: Chrysler Building, New York 17, N.Y.

REPUBLIC
ELECTRO ZINC PLATED SHEETS
ELECTRO PAINTLOK • ELECTRO ZINCBOND



Other Republic Products include Carbon, Alloy and Stainless Steels — Sheets, Strip, Bars, Pipe, Tubing, Bolts and Nuts, Wire, Pig Iron



LABOR: UAW Seeks Curbs on Automation

Auto union would limit installation of labor-saving equipment to peak times . . . Use guaranteed annual wage payments as brake on management . . .

Also weapon to curb plant dispersal—By R. D. Raddant.

♦ **CONTROL** over automation has now become a primary goal of the United Automobile Workers (CIO).

Automation has replaced seasonal unemployment as the leading motivation behind the demand for a guaranteed annual wage. It is now the principal reason for the UAW's new policy of a 2-year limit to future contracts with the auto industry.

Is Main Concern

This is the new philosophy of President Walter Reuther and his autoworkers. It is reflected in both Mr. Reuther's statements and a special automation report submitted to a UAW economic and collective bargaining conference in Detroit. The stand on automation overshadowed demand recommen-

dations made by the union's International Executive Board.

Actually, the Board's specific recommendations skirted the issue of automation in its demands. They included, in review, the guaranteed annual wage, upward revisions on escalator and improvement factor measures, the 2-year limit, a wage boost, and other fringe benefits.

But Mr. Reuther's statements and the lengthy report left no doubt that automation has taken over as the UAW's main concern. It may turn out for better or for worse, to be one of the most significant steps in labor history.

After a brief review of automation, the special report to the conference stated: "The establishment of the guaranteed annual wage becomes imperative for workers in

the face of these new and revolutionary changes developing in our economy."

"Under the guaranteed annual wage," it states further along, "Management would avoid the introduction of automation in times when major layoffs would result. The introduction of new and more efficient equipment would be geared to periods of expanding markets so that other jobs would be available for workers displaced by automation."

Could Slow Dispersion

In simple language the union believes that an employer would hesitate to introduce automation equipment that would result in layoffs if he were faced with the obligation of a guaranteed annual



THE BIG THREE of United Automobile Workers work out demands to be made when 5-year pacts with auto companies end next year. Left to right, Emil Mazey,

secretary-treasurer of UAW; Walter P. Reuther, president, UAW and CIO; and Richard Gosser, vice-president of the UAW.

SPECIAL REPORT

wage. Instead, labor-saving machinery or tooling would tend to be added only in times of expanding production when the penalty of the 52 weeks pay would not hit the employer.

The union would also use the guaranteed annual wage as a barrier to decentralization. It would be a lever to prevent construction of plants that would result in labor displacement or layoffs either because of more efficient operations or a geographical move.

Until recently, there was every evidence that the annual improvement factor, included in the 5-year pacts, was satisfactory in principle to the UAW to compensate for technological improvements. But apparently, this is no longer the case.

A Different Place

The General Motors contract, for example, reads as follows:

Paragraph 101 (a)—“The annual improvement factor provided herein recognizes that a continuing improvement in the standard of living of employees depends upon technological progress, better tools, methods, processes and equipment, and a cooperative attitude on the part of all parties in such progress. It further recognizes the principle that to produce more with the same amount of human effort is a sound economic and social objective.”

The annual improvement factor was one of the points renegotiated last year when automakers voluntarily opened the contracts for revision on several points. They involved pensions, escalator points and the improvement factor, which was raised from 4¢ per hour each year to 5¢.

Wants Voluntary Control

But Mr. Reuther now declares that “we are in a different place in history” than at the introduction of the 5-year contracts. Because of automation, he now declares that the UAW would not go for a 5-year contract even if it gained the guaranteed annual wage. “Absolutely

fabulous” is the way he characterizes automation progress.

While decrying any method of government control over automation, he indicates strongly that the union wants it controlled nevertheless, by voluntary measure. In other words, a new factor for bargaining.

He recalled, in a press conference statement, that in the days of the industrial revolution, workers smashed machinery that did away with jobs. The union doesn't want to smash automation machinery, he stated significantly, but wants to make it work for both labor and management.

NLRB:

Enforce rulings on earlier labor decisions.

National Labor Relations Board will enforce compliance with earlier Board orders to employers and unions in unfair labor practice cases even though the companies would not now come within its jurisdiction under new standards.

By a four to one vote with member Philip R. Rodgers dissenting, the Board denied the request of a West Coast soft drink bottling firm to dissolve an order against it because it would no longer come under Board jurisdiction.

Board decides it will apply its broader jurisdictional standards which exempt small firms in all future or pending cases, but will proceed to enforce compliance in earlier cases because large sums of government time and money have already been invested in deciding these labor cases.

Dump Trucks:

Aluminum bodies cut weight, increase payload.

Payload increases of from 1800 to 3000 lb without exceeding legal loading limits are a prime feature of a new line of aluminum dump truck bodies. Made by Penn Body Div., Hockensmith Corp., the bodies are produced by inert gas shielded arc welding of 5154 aluminum—an alloy recently developed by Aluminum Co. of America.

Compare Weights

Equalling the strength of conventional bodies, Penn's will be produced in lengths from 12 to 22 ft with load capacity ranging from 10 to 25 cu yd. Weight, including hoist, of a 12-ft aluminum body, is 2200 lb as compared to a welded steel body's weight of some 4000 lb. In the 20-ft length the aluminum body weighs 5500 lb while an equal-sized steel dump truck body weighs 8500 lb.

As well as permitting heavier payloads, the lighter weight also saves money by cutting gasoline and tire costs when the truck is running empty or with a light load. According to Alcoa, 20 years of experience with aluminum dump bodies has increased profits by a considerable amount.

Resists Sulfur

Aluminum-bodied dump trucks have been successfully used for hauling such loads as coal, lime, sand, gravel, cinders, fertilizer and bulk grain. Aluminum is especially useful with coal because of its good resistance to corrosion of sulfur compounds.



WELDED aluminum dump body boosts legal payloads, cuts expenses.

SCRANTON: New Plants Lure Industry

Pennsylvania community recovers from anthracite depression by community financing plan . . . Builds plants, then seeks buyers . . . Federal Electric latest new plant . . . Skilled labor plentiful in area.

♦ A \$2-MILLION PLANT recently became the twenty-first to open in the Lackawanna Valley of eastern Pennsylvania under a unique community financing plan.

The new plant, the Eastern Switchgear Div., Federal Pacific Electric Co., is starting at Scranton, Pa., with 300 employees, plans to double that figure within a year. The community-sponsored Lackawanna Industrial Fund Enterprises (LIFE) financed \$900,000 of the cost of the plant. It is a lease-buy deal which will make the company sole owner in 10 years.

Skilled Labor Plentiful

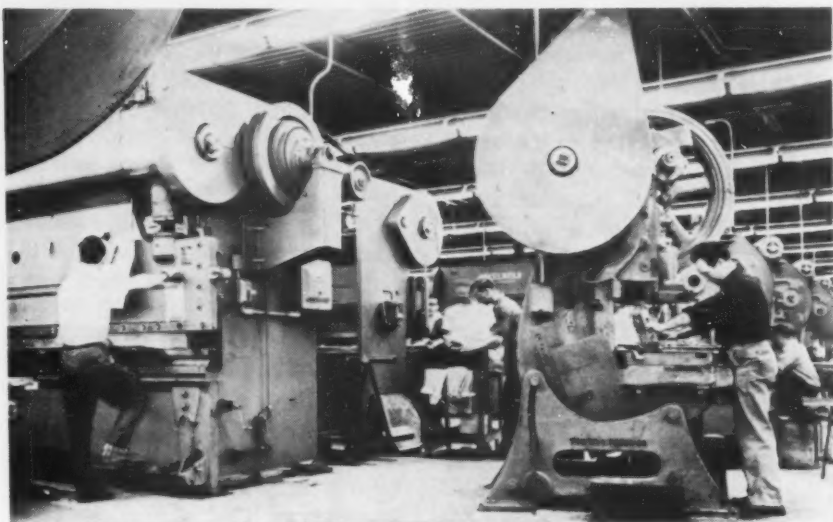
Federal, with nine plants throughout the U. S., had been making high voltage outdoor equipment for utilities and low voltage equipment for household and industrial use. Its officials decided they needed a plant to make assembled switchgear to fill the gap between these two lines. They hope thereby to double their sales (currently \$34 million annually) in the fast growing electrical industry.

Why did they select Scranton? One reason given by executive vice-president T. M. Cole is accessibility to important market areas. Financing was another; nearness to supply sources a third. Finally, he said, "The area has a pool of highly skilled industrial labor."

Build Plant First

This "pool" ("lake" might be a better word) is the reason behind the so-called "Scranton Plan." This once-rich anthracite capital of the world hit the skids when the bottom dropped out of the anthracite market.

When World War II ended Scranton residents bought \$1.2 million in first mortgage bonds to take over



PARTS used in switchgears are stamped out at Federal Electric plant.

the local B-29 bomber wing plant. Then they induced Murray Corp. of America to move in. Murray now employs 1000 in household appliance production.

This was the first of 21 community-financed plants in the Scranton area; Federal's is the latest. Now, instead of lining up a buyer first, the community builds a plant, then seeks a buyer. It has just about completed a 60,000 sq ft building and is starting one to contain 100,000 sq ft.

In addition to the 21 plants financed by LIFE and its predecessor development companies, some 29 privately-financed plants have gone up since the war.

Employ 6600

Latest deal, not a new plant, was restoration of the abandoned Lackawanna RR steam engine shops. This is now an auxiliary shell plant, operated for the government by U. S. Hoffman Machinery Co., and employing 1500 workers.

A number of the community-financed plants are in metalwork-

ing, including Scranton Battery Corp., Superior Fireproof Door & Sash Co., The Trane Co., U. S. Textile Machinery Co., Poloron Products Co., W. L. Maxon Co., and Daystrom Instrument Div.

Scranton is still a long way from being a prosperous looking community. But businessmen shudder to think what it would be like if the industrial development program hadn't started when it did. The community-financed plants alone employ some 6600 people with a payroll of \$23 million a year.

As any one will tell you, Scranton is a "Chamber of Commerce" town. The Chamber runs the town on the theory that its very life depends upon attracting and holding industry. This has a good effect on industry's relation with the community. "There's something about knowing that we're all in this together that makes things a lot easier," said E. P. Williams, who runs the new Federal plant.

He added, "We find our workers very good production men; if they don't know the job they're easily trained."

FOLLANSBEE: What Republic Plans

Minority stockholders seek to block sale to Richmond . . . If deal goes through Nov. 30 as planned, Republic will buy equipment for new expansion at Gadsden . . . Will run some at Follansbee—By T. M. Rohan.

◆ THE OFF AND ON Follansbee Steel Co. deal last week shaped up like this:

Follansbee majority stockholders had agreed to the purchase of plant assets by Frederick W. Richmond, New York financier after rejecting an offer by a syndicate headed by Cyrus W. Eaton, Cleveland financier. But hearings were being held in Wheeling U. S. District Court in which 48 minority stockholders were trying to block the \$9,286,000 sale. Deal is scheduled to be consummated Nov. 30.

Congress is also investigating.

Continue for One Year

Republic Steel, which has offered to buy certain plant equipment as nucleus for flat-rolled expansion at Gadsden, Ala., agreed to continue operation at Follansbee for one year of terneplate and blued sheet facilities employing 75. This type leaded terneplate is used principally for roofing and blued sheet for stovepipes.

Republic's agreement to purchase cold-reduction facilities of Follansbee is the core of a new program for expansion and streamlining of flat-rolled steel production facilities in the growing Southeast market. Follansbee's modern equipment and relatively small output (288,000 annual tons) fits into Republic's Gadsden, Ala. works where they will be moved, like a hand into a glove. Decision to purchase the equipment, presumably for far less money than comparable new facilities, was therefore not long in coming.

Replace Hand Mill

Equipment consists of two cold-reducing strip mills, one cold-finishing strip mill, two continuous cold sheet mills, and auxiliary equipment. In addition there are

two tinning pots for long terne sheets which will probably not be moved to Gadsden at present. Rated annual capacity is 150,000 tons of cold-rolled strip, 100,000 tons of cold-rolled sheets and 31,000 tons of long terne sheets.

At Gadsden the cold-finishing equipment will be utilized by Republic to produce coil stock for a new continuous galvanizing line enabling replacement of out-dated hand mill and hot-dip galvanizing. Major justification for continued production on the uneconomic hand mill there has been as an adjunct to the company's heavy wire sales to southern rural market.

The Follansbee facilities will ultimately be bracketed by additional hot-rolling facilities to reduce output from the 112-in. plate mill to 16-gage coils for additional cold-reducing. Eventually other flat-rolled products may be added although the present market does not justify a large scale continuous mill.



"That new foreman's a bugger on close control."

One of the major immediate benefits of the Follansbee facilities will be increased utilization of the Republic plate mill, taking up the slack from present slump in market for large diameter pipe. The plate mill, rated 300,000 annual tons, has been running at near capacity until well into this year producing skelp for pipe, supplying breakdown for sheets and producing merchant plate. With the decline in market for large diameter pipe, rolling time can be utilized for sheet production.

Republic's move will place it in a better competitive position with Tennessee Coal & Iron Div. of U. S. Steel at Birmingham. This mill some years ago installed additional rolling stands behind a plate mill for production of hot-rolled bands. Output from this is cold-reduced for tinsplate and continuous galvanizing lines and also sold as hot-rolled sheets.

Republic and T. C. & I. are directly competitive in the immediate Alabama and southern markets extending into southern North Carolina, eastern Mississippi, and western Georgia, where they have a freight advantage against barge transportation from northern producing centers. Republic's other Gadsden products are bars and small structurals, merchant wire, galvanized sheets, plates, large diameter pipe, nuts and bolts and fabricated construction products by Truscon Steel Div.

During changeover from hand mill facilities, which will probably be put on standby, sheet will be furnished customers in the area from accumulated stocks or from other Republic facilities at Canton, Warren and Cleveland.

Removal of the mill has been characterized as a death blow to the community. Its heaviest im-

fact, however, will probably be in loss of tax revenue. Some observers indicate that no more than half the employees live in the town at present. In addition, within a 10-mile radius are major mills located at Steubenville, O., and Wheeling, and Weirton, W. Va., all in allied fields and on the upsurge.

Republic also last week advised Mr. Richmond that in the event Republic acquires Follansbee machinery and equipment, Republic will continue operating at that plant the terneplate department and the blued sheet department for a period of not less than one year. Cold-rolled sheets and strip will be furnished from Republic's other plants.

If Republic finds these operations satisfactory from an economic and profit standpoint and can make arrangements for use of plant space, Republic will consider continuing the operations at Follansbee. Jobs at Gadsden will be offered to 150 Follansbee employees after equipment is moved.

Follansbee:

Senate scans monopoly laws on sale to Republic.

A Senate antimonopoly subcommittee will go ahead with full-scale, circus type hearings and investigations of the proposed sale of Follansbee Steel Corp. to Republic Steel Corp.—regardless of the outcome of a minority stockholders' suit to block the sale in a Federal District Court in West Virginia.

Armed with reports from the Justice Dept. and Securities & Exchange Commission, the subcommittee, headed by Sen. William Langer (R., N. D.) will conduct a "full and searching investigation into the proposed sale to determine whether it will violate the anti-monopoly statutes."

Other members of the Senate unit, Sen. Harley M. Kilgore (D., W. Va.) and Sen. Estes Kefauver (D., Tenn.), as well as Gov. William Marland of West Virginia, have opposed the sale.

A member of the subcommittee told THE IRON AGE the unit wants to know why Republic Steel did not try to buy the plant directly. It

will seek to determine whether, if the sale directly would have violated the Clayton Antitrust Act, it is also illegal if sold through a third party.

Ostensibly, the Follansbee probe is one of a series of investigations into the effects on competition when a large firm absorbs a small firm. But it is known that union leaders, officials and some businessmen at Follansbee are putting strong pressure on to block the sale.

Container:

Lightweight aluminum box doubles as pallet.

Space, weight and convenience were uppermost in the minds of designers who fashioned a new aluminum collapsible combination pallet and container. It is being introduced to commercial and military air cargo operators.

Developed by Kaiser Aluminum & Chemical Corp., the prototype was made by Hart Metal Products Corp. of Elkhart, Ind. It specifically meets Air Force needs.

Measuring 40 in. in height and width and 48 in. in length, it has a load capacity of 17 lb per cu ft—a working load of 800 lb. The pallet-containers can be stacked three high in storage, two high in an aircraft and indefinitely high when empty and collapsed.

Tare weight is held to 65 lb by

MATERIALS HANDLING

using corrugated aluminum for all six sides, extruded aluminum edges and cast aluminum cleats. Only non-aluminum parts are the stainless steel clips which hold the works together. The extruded channels frame each panel mesh with each other in assembly so that only six of the clips are needed.

Box is assembled by cam-hinging the channels at the bottom and folding them up. Top is hinged to one end and closed like a lid. This permits loading the container through the top or either side panel.



STACKED height is only 9¾ in. for first collapsed pallet, 7¾ in. for each additional one.



FORK-LIFT truck can handle new aluminum pallet-container from any side.



Consider your secretary's good left arm!

The carriage on her typewriter makes up to 3000 trips a day. And a slam-bang voyage it is. Yet the motion of this carriage must be ever so smooth and exact to give you the clean, smart impressions that are the trademark of a good typewriter.

Tiny rollers under the carriage help to make this precision possible. Inspecting them to assure the close tolerances required had always been an expensive hand operation—until one manufacturer recently asked Taft-Peirce to find a faster, better way.

Taft-Peirce engineers designed a machine that automatically feeds the rollers into an air gage . . . simultaneously measures two diameters, and checks them for out-of-roundness . . . then sorts them into oversize, undersize, or within tolerance groups. Today, this one machine does in an hour what formerly took many man-hours to do. Pays for itself every few weeks.

For a complete picture of the many services Taft-Peirce renders to industry, write for illustrated 92 page booklet, "Take It To Taft-Peirce".



For Engineering, Tooling, Contract Manufacturing
TAKE IT TO TAFT-PEIRCE

The Taft-Peirce Manufacturing Company, Woonsocket, R.I.

TELEPHONE: WOONSOCKET 1

DEVELOPMENT

Ore:

**Canadian Javelin developing
huge Labrador iron ore field.**

Beginning of another chapter in the fabulous story of iron ore in Canada was unfolded in New York early this week. Canadian Javelin, Ltd., revealed it had spent more than \$1 million during the past year exploring and proving a huge deposit of iron ore in Labrador.

The huge deposit is virtually astride the 365-mile railroad recently completed by Iron Ore Co. of Canada to bring ore to the coast from its Knob Lake mining operations. Located about 30 miles west of the railroad, heart of the holdings is in the Wabush Lake area. The company has already drilled 16,000 ft.

Easy to Concentrate

A report from Battelle Institute indicated average iron content of the drillings at 36 pct Fe. This was said to be readily concentrated to 65.5 pct Fe. The concentrated sample contained 5.2 pct silica.

The ore is a very soft specularite, a crystalline variety of hematite. Paul E. Pesonen, chief engineer of Canadian Javelin, said it is tentatively planned to concentrate the ore by means of the Humphrey Spiral Process which utilizes the principle of centrifugal force. Mr. Pesonen indicated the concentrated product would probably be put back together by means of sintering with coal.

John C. Doyle, chairman of the board, said drilling has indicated presence of 1.63 billion tons of ore, of which 468 million tons have been measured by close drilling.

The Canadian Javelin holdings were formerly in concessions controlled by founders of Iron Ore Co. of Canada. They became available when holdings of the company had to be reduced in accordance with law. Canadian Javelin also revealed recent acquisition of open pit, premium quality, openhearth ore mines in Chile. Beginning in 1955 the company expects to ship about 500 thousand tons of premium ore per year.

OPMENT
 Ore:
 loping
 e field.
 pter in
 ore in
 w York
 favelin,
 t more
 e past
 a huge
 ador.
 irtually
 ad re-
 Ore Co.
 e coast
 opera-
 es west
 e hold-
 ce area.
 drilled
 entrate
 nstitute
 tent of
 e. This
 concen-
 concen-
 5.2 pct
 specu-
 ety of
 n, chief
 in, said
 concen-
 of the
 which
 trifugal
 ted the
 d prob-
 y means
 a of the
 ndicated
 s of ore,
 ave been
 holdings
 ons con-
 ron Ore
 e avail-
 company
 cordance
 lin also
 of open
 enheart
 ning in
 to ship
 of pre-
 EN AGE

PRODUCTION



EXTRUSIONS produced by the 14,000-ton press at Alcoa's Lafayette plant for aircraft use. Their huge size, up to 110 ft long with heavier sections, reduces the amount of joining needed in building big airplanes.

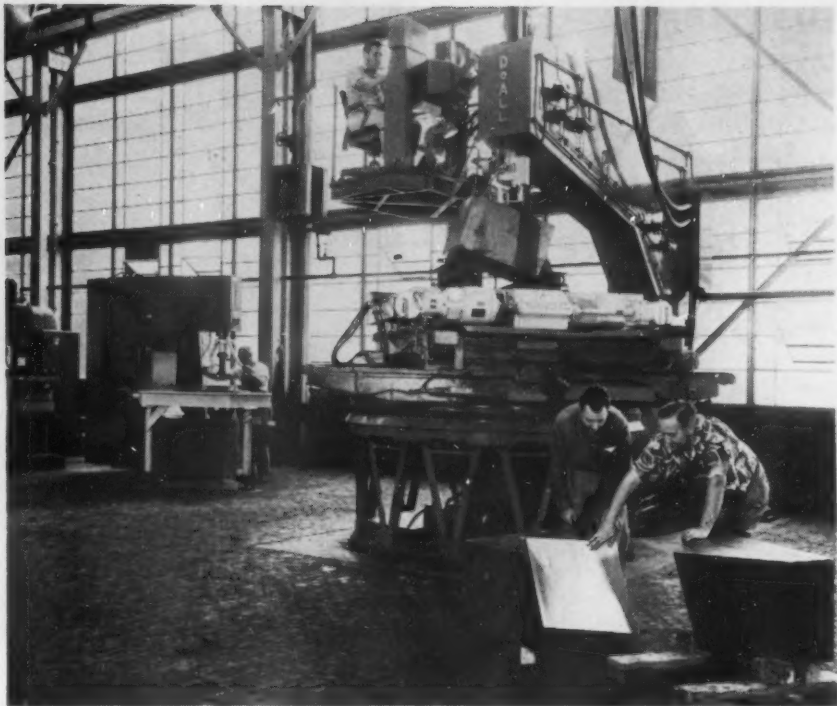
HUGE band saw (foreground) and die filer (background) are claimed to be the world's largest. Saw can cut intricate die shapes in blanks 26 in. thick and 52 in. diameter weighing up to 10 tons.

Tooling:

It takes big tools to make heavy press dies.

The 14,000-ton extrusion press currently in use by Aluminum Co. of America is squeezing out some healthy chunks of metal—but it needs the help of some other sizable pieces of equipment. Two of these are a monster band saw and jig filer. Built by DoAll Co., they're claimed to be the biggest in the world.

Saw and filer are used in pro-



duction of extrusion dies for the Air Force-owned heavy press at Alcoa's Lafayette, Ind., plant (See THE IRON AGE, May 27, p. 79).

Capable of cutting die apertures in steel blanks 26 in. thick, the 16-ft high saw is operated by remote control. Operator views his work in a periscope-like mirror arrangement and steers the work with an aircraft type control wheel. This is associated with an electronic computer that automatically coordinates the motion of three vertically arranged power-driven tables.

Saw is also used in producing the huge gripping jaws of Alcoa's 3,000,000-lb stretch straightener which is used for tugging out the curves of extrusions.

After the saw's work is done, its die apertures are further finished on the DoAll jig filer. This machine is unusual not only in its size but also in the fact that the workpiece remains stationary and the file head moves. This design innovation was necessitated by the unmanageable weight of the huge dies. Entire jig frame swings on anti-friction bearings.



OPERATOR literally "pilots" saw through die blank. Note mirror view.



OUTLINE of extrusion is sawed directly in blank. Saves time.



WORKPIECE is stationary, file head moves, reversing usual setup.

What it takes to make a 3000 Degree Refractory Concrete



Because of the widespread interest in the use of refractory castables, many furnace operators have asked us for the story behind the performance of B&W's unique refractory concrete, Kaocast.

Here are the answers to some of the most frequently asked questions:

Q. When you refer to Kaocast as a 3000 degree refractory castable, do you mean that its melting point is 3000° F?

A. No, this means that its service use limit is 3000° F; its melting point is 200 degrees higher.

Q. Just what does it take to make a 3000 degree refractory castable like B&W Kaocast?

A. Let's first define a few terms. Refractory castables are made with granular materials which are volume stable at high temperatures and which can undergo repeated heating and cooling cycles without disintegration. These materials, known as refractory calcines or grogs, are blended with suitable hydraulic binders. The initial strength of a refractory castable is thus developed in the same manner as that of ordinary concrete—that is, through the chemical action between water

and the binder. A strong *ceramic bond* is formed when the refractory castable is subjected to temperatures above the vitrification point.

Q. Then you have a grog, a binder and a method of putting them together. Which is most important?

A. You can't say that any one is most important. It's a combination of all three. Let's take them one at a time. Our grog consists primarily of the proper blend of kaolin and other alumina-silica materials. This ratio enables us to achieve a grog with minimum expansion and shrinkage, a high fusion point, and greater stability under load, at varying temperatures.

Q. And now, what about the binder?

A. There are a number of factors responsible for the success of the Kaocast binder. One is the compound Tricalcium Penta-aluminate (3 lime to 5 alumina). This formula produces the most refractory compound (highest melting point) that can be made from lime and alumina. Another is that by using the purest commercially available lime and alumina, the Kaocast binder is substantially free of iron and silica. Such traces of these that are present combine during the pre-

firing of the binder to produce stable compounds.

Q. Just how important is the manufacturing or "blending" of the grog and the binder?

A. If one factor could be singled out as "most important" it would be quality control.

Direct control over the fineness of materials, pre-firing temperatures, and other phases of manufacture is possible at B&W because both the grog and the binder are made and blended at B&W's Augusta Works—under B&W's direct control and supervision.

Q. These factors you've discussed must add up to some specific advantages of Kaocast. What are they?

A. B&W Kaocast has all the advantages of easy installation which are responsible for the widespread interest in refractory concretes, plus these exclusive features: It is the only 3000 degree refractory concrete with high resistance to spalling and low volume change throughout its operating range.

THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga.

CR SHEET: Tight Through First Half

Automotive demand dumped on top of other demand reversed the cold-rolled sheet market in a month . . . See capacity production of this item by year end . . . Screen orders for duplication—By T. M. Rohan.

◆ **LEADING** steel market analysts in the Ohio River Valley last week turned their attention to the tight cold-rolled sheet situation and agreed:

- (1) Cold-rolled sheets are likely to be in tight supply until June.
- (2) Incoming orders are being carefully screened to eliminate duplicate orders by customers or speculators on hedge buying.
- (3) Production will be almost 100 pct of cold-rolled sheet capacity by year's end.
- (4) There will probably be no price increase or change in the competitive situation because steel firms realize the pattern is seasonal.
- (5) No conversion deals have been offered or are in prospect because the need is temporary and increased costs are prohibitive.

Autos Take Half

The cold-rolled sheet market change from almost spot delivery to 8 weeks or more in the space of little over a month was termed "The most complete market reversal I've seen in years in the steel business" by one steel sales official last week. Another said, "Two months ago we waited until Friday morning to schedule the following week. Now we're taking them for January."

Big push, of course, is coming from the automobile industry which in 1953 absorbed 5.6 million tons or just about 50 pct of total output of 11.2 million tons. Other markets were 1.3 million tons for warehouses, 1.08 million tons for appliances and 1.5 million tons for other domestic and commercial equipment, containers and electrical machinery and equipment.

Current auto demand is being

superimposed on order books already stabilized with commitments for plate, strip and coils taken when the auto market was in the doldrums. Sheet producers feel auto consumption will stay heavy through winter and spring for spring car sales. An extra shot in the arm will come in early spring from appliance makers for late spring sales. Warehouse ordering is also stepping up, indicating low inventories and increased markets.

In the broad area of the Ohio River Valley, Cleveland and Buffalo, representing 53.8 pct of U. S. cold-rolled sheet capacity, most mills are running between 83-88 pct on this product. Detroit mills, representing 17.8 pct of CR sheet capacity, are running 88 pct total ingot output principally due to run on sheets. Chicago, with 14.8 pct of sheet capacity, is at 87.5 pct of total ingot capacity, although product mix is more varied there.

Delivery dates on wider mills are late December but on narrower, products are creeping into February. Even in California where use for autos is less than 5 pct, delivery dates from the two producers are backed into late December and mounting steadily.

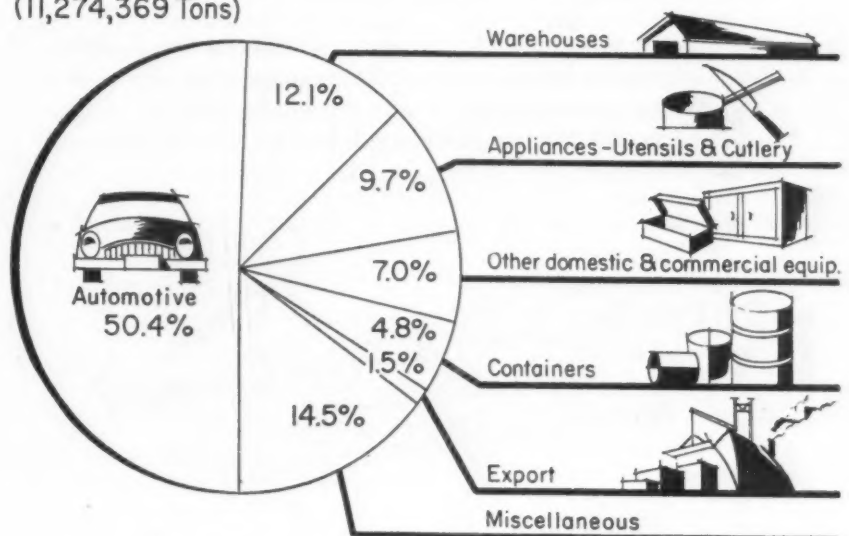
Foresaw Tightness

One of the most frustrating aspects to steelmen is that they saw the avalanche coming but could not convince customers to get in their orders. About 12 pct of cold-rolled sheet this year came from accumulated inventory. As early as mid-August, Republic Steel at Cleveland instructed all salesmen as follows:

"The normal fall seasonal upturn is close at hand. Add the two factors together (traditional over-correction of inventories and fall seasonal upturn) and you have a condition which could well catch some customers embarrassingly short of steel with inven-

COLD-ROLLED SHEET CONSUMPTION - 1953

(11,274,369 Tons)



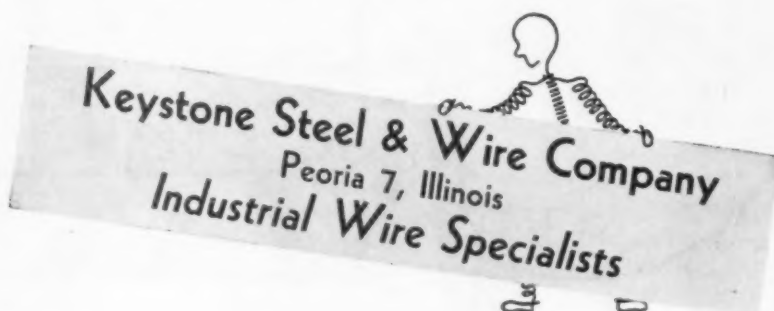
Source: American Iron & Steel Institute



Manufacturers of Phillips head and other precision cold headed parts know a good thing when they *see the production records!*

In plants where Keystone "Special Processed" Wire is on the job, output per machine, per man, per hour has increased. Die life, for example, is often more than doubled — which in turn decreases machine down time and labor costs. A higher quality end product with its lower rejection rate helps place the per unit cost on a much more profitable level.

The superior grain flow characteristic of "Special Processed" Wire, together with its structural soundness, give this wire unsurpassed performance on any unusually difficult cold heading job. For further information, contact your Keystone representative or write direct.

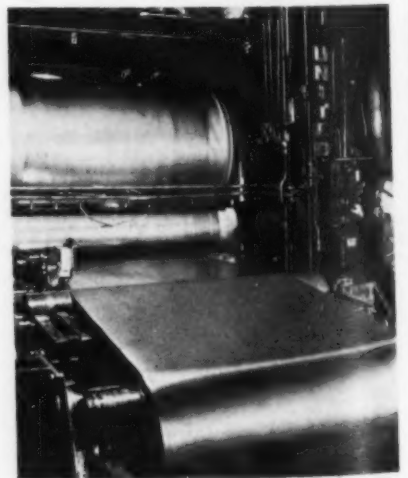


tories low and consumption rising . . . We know the automobile manufacturers will be planning on greatly increased shipments of sheets . . . We would like to suggest that you caution your customers to take a long look at their inventories of steel sheets now . . . We think there is a strong possibility that some sheet users may find themselves seriously embarrassed some time in the fourth quarter."

Today steelmen are doing their best to meet demand by urging customers to closely examine inventories and spread out orders where possible. They are also favoring old customers.

Steelmen were able to forestall the shortage through inventory accumulation at mills only to a very small degree. Cold-rolled sheets normally are almost custom made to customer specifications in large quantities.

Last thing steel mills want is a rash of scare ordering. One steelman said last week his firm's backlog almost evaporated this year when customers duplicated orders with at least six firms in the hope one or two would come through. When they did, other orders were cancelled. Another firm's backlog of 2 million tons almost totally disappeared in this manner early this year. Same psychology of shortage still prevails, accounting for present close order screening.



COLD-ROLLING sheet on Republic Steel's 98-in. 3-stand mill.

COAL: Industry Ponders Problems

Seek to boost lagging consumption . . . Oppose oil imports . . .
 Lewis' UMW makes no immediate demands . . . See overall sales increase in 1955
 . . . Long-range outlook for doubled tonnage—By J. B. Delaney.

♦ WHAT the soft coal industry needs most is a shot of good business. Poor demand was the chief topic of discussion at the 37th annual meeting of the National Coal Assn. in Pittsburgh.

Even John L. Lewis and his United Mine Workers were shunted aside momentarily as industry leaders wrestled with the problem of what to do about getting coal back on its feet—now. Predictions of a rosy future when competing fuels become less available and major markets expand their requirements were of little comfort to coal operators struggling to keep their heads above water.

Oppose Fuel Imports

The industry concentrated its attack on residual fuel imports. This cheap fuel, a headache to coal since 1948, amounted to 50 million tons of coal equivalent last year, compared with 17 million tons in 1946.

This sort of thing, say the operators, not only hurts a basic domestic industry but encourages dependence on a foreign fuel supply "that would be almost entirely cut off in the event of war." NCA has been after Congress to restrict these imports.

Criticize Railroads

The railroads, once coal's biggest customer, but now a relatively small one due to dieselization, were criticized for "discriminatory" freight rates. This compounds the competitive problems of coal, producers complained. The railroads reply that coal rates are "just and reasonable."

The tough market situation has led to price-cutting by fringe operators, even by some larger companies. This is a source of

hard feeling within the industry.

Even the weather appears to have turned against coal. A series of mild winters has hurt the space-heating market.

See Pickup In 1955

But there are some optimistic signs, too. Next year will be no worse than 1954, is likely to be better. Steel and utilities, big consumers, are shaping up well for 1955. Consumer inventories were reduced this year. The export market has picked up, and shipments next year are expected to at least equal those of 1954.

Coal consumption this year will be approximately 395 million tons,

but production will be about 10 million tons less due to withdrawals from stockpiles. Consumption in 1953, including exports, was approximately 460 million tons. Steel and coke consumed 119 million tons in 1953, but dropped to about 90 million tons this year.

From a long-range standpoint, the President's Materials Policy Commission predicts that coal requirements will approach 800 million tons by 1975.

No Atomic Competition

The industry is not concerned about possible inroads of atomic power. They say nuclear power

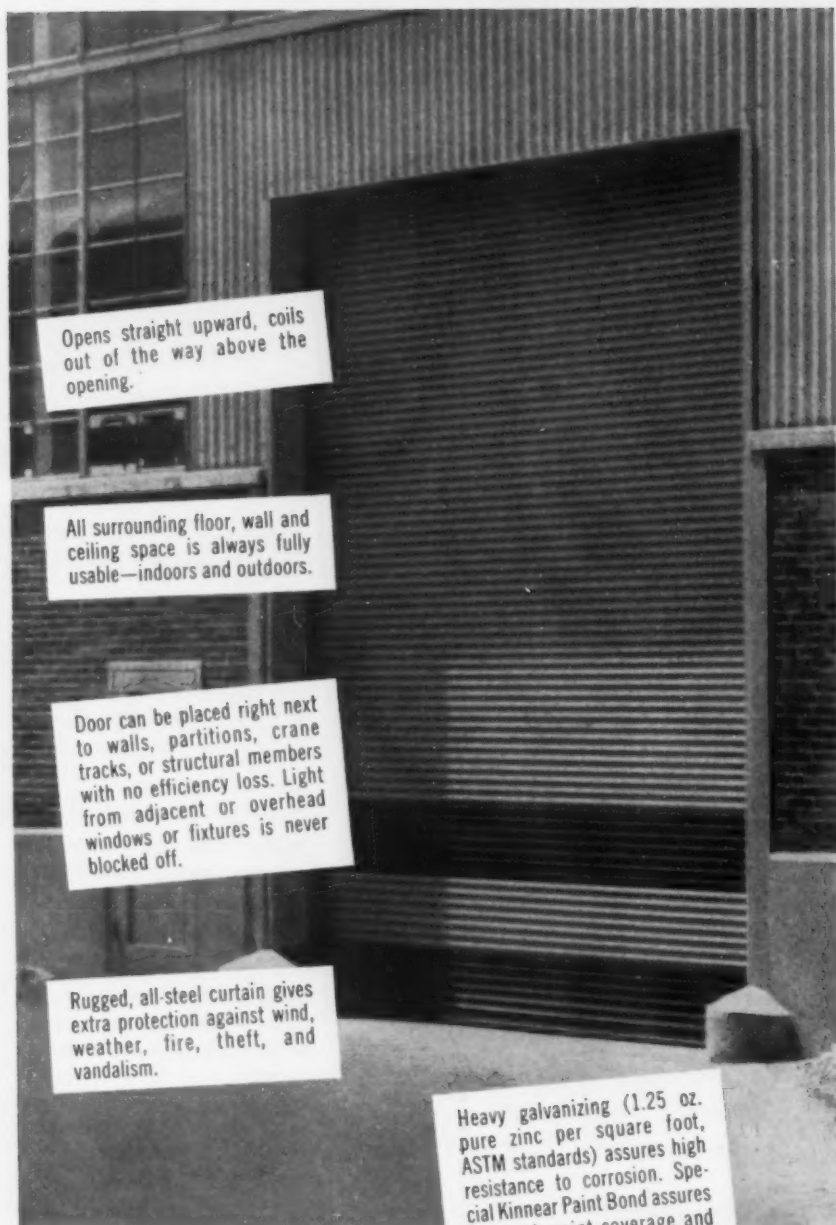
Bituminous Coal Consumption—Millions of Tons

MARKET CATEGORY	ACTUAL		ESTI-MATED	INDICATED
	1953	1954	1954	1955
Electric Utilities	112	115		Should increase unless offset by further inroads of residual oil
Steel & Coke	119	90		Will increase slightly, reflecting expected improvement in steel operating rate
Railroads	28	17		Further decline of 5 million or so tons likely
Other Industry & Retail	167	142		Retail component in gradual decline; general industry a stand-off unless activity improves considerably next year
Exports to Canada	20	15		Further decline
Overseas Exports	14	16		Unpredictable—depends on government policy, etc.
Total Consumption	460	395		
Reported Production	453	385*		
Stock Withdrawals, Changes of Coal in Transit, etc.	7	10*		

* One improvement for 1955 production may result from stabilization of stockpiles; that is, production may closely approximate consumption.

Kinnear

Steel Rolling Doors



Opens straight upward, coils out of the way above the opening.

All surrounding floor, wall and ceiling space is always fully usable—indoors and outdoors.

Door can be placed right next to walls, partitions, crane tracks, or structural members with no efficiency loss. Light from adjacent or overhead windows or fixtures is never blocked off.

Rugged, all-steel curtain gives extra protection against wind, weather, fire, theft, and vandalism.

Heavy galvanizing (1.25 oz. pure zinc per square foot, ASTM standards) assures high resistance to corrosion. Special Kinnear Paint Bond assures thorough paint coverage and lasting paint adhesion.

Write today for full details

The KINNEAR Mfg. Co.

FACTORIES:

1760-80 Fields Ave., Columbus, Ohio
1742 Yosemite Avenue, San Francisco 24, Calif.
Offices and Agents in All Principal Cities

Saving Ways in Doorways
KINNEAR
ROLLING DOORS

RAW MATERIALS

plants have a long way to go before they can compete costwise with coal-generated power.

Promote New Markets

As for John L. Lewis, he's been unusually quiet this year. The coal producers say there's no reason why he shouldn't be, with business the way it is and his members already enjoying "the highest daily earnings of any industry group in the country." Mr. Lewis has been free to reopen his contract but hasn't felt inclined to do so.

The industry has been doing a better job of promoting future markets and lining up topflight engineers and administrators. Mechanization and application of up-to-date engineering techniques are increasing productive efficiency. In 1937, the per manday output was 4.69 tons; last year, 8 tons.

Correct Wrong Ideas

NCA's Vocational Training & Education Committee is in contact with 28 colleges with accredited courses in mining engineering. It has been able to sell more engineering graduates on a career in coal. At the same time it has managed to correct some misconceptions about coal among faculty and students.

Coal people are working hard—and making progress—in public relations and product promotion. At the same time they acknowledge that there's a lot of catching up to do in these and in other directions.

Increase Copper Take

Military and atomic energy producers will require 3500 tons more copper in the first quarter of 1955 than in the present quarter, Business and Defense Services Administration stated in a recent announcement.

As a result of changes in military specifications and orders, producers of prime goods for the military ("Z" products) and defense related items ("B" products) will require 63,000 tons of copper for the quarter.

MAGNESIUM: Production Rate Rebounds

**GSA extends current Dow lease on Velasco to Jan 31 . . .
Plant back up to capacity . . . Still no answer on what will happen to
nation's biggest magnesium producer—By K. W. Bennett.**

◆ **DESPITE** a sinking magnesium output in third quarter, advancing operations will bring the total estimated domestic output in 1954 to 70,000 tons.

Despite predictions earlier this year that production of the light metal would hit 72,000 tons, the outlook by the end of September didn't justify the estimate. From a March high of 6545 tons, output declined gradually to 4184 tons in September. Current capacity operations at Velasco and Freeport, rated at annual outputs of 45,000 tons and 30,000 tons, respectively, should enable attainment of the 70,000-ton forecast.

At the same time, industry sources report that shipments of wrought magnesium products, when the year's end is reached, should hit 6500 tons and the castings total for the year will reach 12,500 tons.

For magnesium, the figures mean a drop across the line. Recently available Magnesium Assn. and Dow Chemical Co. statistics place the 1953 castings total at 17,300 tons, the wrought magnesium total at 8443 tons, and total primary production of magnesium at 93,075 tons.

Justice Says "No"

Though still retreating from the 1952 Korean War high, the industry is now broadening its markets.

Three plants are in production: The AEC-operated Canaan, Conn., plant, Dow's Freeport plant and Velasco, being operated by Dow on an extension of the old Oct. 31 lease. With the Justice Dept. still thumbs down on purchase of this plant by Dow, and no other takers in sight, it seems very possible that output will be limited after first

month next year to the 2500 monthly tonnage of Dow's Freeport plant. At current rate, consumption would top output by 1000 tons in first quarter.

General Services Administration has extended its Velasco lease for the second time. New extension is up Jan. 31, and GSA says it will either have signed a new lease, secured a new buyer, which is doubtful, or have secured approval of the Justice Dept. to sell the plant to Dow.

GSA won't say whether it is buying any magnesium for the stockpile. But there are some interesting features of the lease under which Dow has been running the plant. The plant is operated "for the government's ac-

count," which means that unsalable production is the government's, and where else can it go but into the stockpile, a GSA spokesman points out. This means that it is possible for Freeport to be operated at or near capacity for commercial demands, and Velasco run at or near capacity and the government must take excess production. Plant has not been at capacity recently.

With missile operating temperatures moving into the 500-1000°F range, missile usage of magnesium alloys is expected to grow at a pace slightly ahead of actual missile procurement, it was reported at the Magnesium Assn. meeting at St. Louis last week.

Turn Page

IRON & STEEL, October Output By Districts

As Reported to the American Iron and Steel Institute

BLAST FURNACE —NET TONS	Annual Capacity	PIG IRON		FERROMANG. & SPIEGEL		TOTAL		Pct of Capacity	
		October	Year to Date	October	Year to Date	October	Year to Date	October	Year to Date
DISTRICTS									
Eastern	17,261,850	1,007,603	9,851,395	11,254	164,520	1,018,857	10,015,915	69.5	69.7
Pitts.-Yngstn.	29,501,270	1,673,122	16,179,283	19,344	203,067	1,692,466	16,382,350	67.5	66.7
Cleve.-Detroit	8,714,680	562,418	4,816,261			562,418	4,816,261	78.0	66.3
Chicago	16,371,250	1,043,883	10,231,155			1,043,883	10,231,155	75.0	75.0
Southern	6,273,080	413,091	4,030,740	12,692	85,927	425,783	4,116,667	79.9	78.8
Western	3,879,260	237,319	2,275,711	2,954	2,954	240,273	2,278,665	72.9	70.5
TOTAL	82,001,390	4,937,436	47,384,525	46,244	456,488	4,983,680	47,841,013	71.5	70.0

STEEL —NET TONS	Annual Capacity	TOTAL STEEL				ALLOY STEEL*	
		October	Year to Date	Pct of Capacity		October	Year to Date
				October	Year to Date		
DISTRICTS							
Eastern	25,064,060	1,558,077	14,446,859	70.9	67.1	112.4	106.2
Pitts.-Yngstn.	44,348,060	2,627,099	24,778,444	69.7	67.1	92.7	89.1
Cleve.-Detroit	12,791,780	854,915	7,040,512	78.7	66.1	139.8	117.4
Chicago	27,371,700	1,764,057	16,912,154	75.9	74.2	113.4	110.8
Southern	6,932,340	443,024	4,438,494	75.2	75.3	127.1	127.2
Western	7,022,470	454,361	4,408,689	76.2	75.4	120.8	119.5
TOTAL	124,330,410	7,701,533	71,935,152	72.9	69.5	108.3	103.1

* Included under Total Steel.

** Based on average production of the three years 1947 through 1949 as 100.

x Revised.

GOVERNMENT: Test Readiness

Key U. S. workers go through first exercise testing plans for operation in case of attack . . . Disperse over wide area—By N. R. Regeimbal.

♦ **FEDERAL** officials, long urging industry to make plans to operate in event of an enemy attack, are testing their own plans to make sure necessary government services will be functioning if Washington is attacked.

Some 2000 government employees from key departments and agencies were sent scurrying out of the city Saturday in the first mass test of federal preparedness plans.

Assume Full War

The workers, under direction of the Office of Defense Mobilization (ring-leader in the exercise) left at various times by automobile to their emergency posts, some going as much as 300 miles from the Capital. At 10 a.m. Saturday, they were scheduled to be at their emergency stations and the 7-hour exercise began.

The federal employees assumed Washington was "knocked out," the country was at war. They began to set in motion all the programs needed to keep the country going—price, wage and credit stabilization; materials controls;

production planning; transportation programs and military defense and offense.

Test is one of a series, an ODM spokesman says. Other tests will be held and the plan revised from lessons learned last week.

Some Not Ready

Although officials will not comment on the weak spots in the plan, there are two holes which would hamper its operation if an emergency came soon:

District of Columbia civil defense officials have not yet completed their plans for actual physical evacuation, so that this test had to be conducted after personnel had reached emergency posts.

Although government has been working for some time to complete all details of its defense plan, that phase involving duplicating and storing of necessary records and completely equipping emergency stations has not yet been completed.

The plan which the government is using is similar to that which ODM is recommending industry prepare. It works like this:

In event of an alert, all government employees as well as other workers in the District of Columbia will be evacuated, with essential government workers going to emergency stations. Employees without relocation assignments, will join their families and forward registration cards after the attack to a registration center operated by the Civil Service Commission. Those who are uninjured will then be told where and when to resume work for the government.

In order to assure continuity of executive direction, lines of succession to top posts have been designated and emergency authority has been delegated to permit regional directors to carry out the functions of entire agencies if necessary—similar to designating management succession lines and alternate sources of production in industry.

Kaiser Starts on A-Power

Kaiser Engineers Div. of Henry J. Kaiser Co., Oakland, Calif., is the eighteenth firm approved by Atomic Energy Commission to study the feasibility of constructing and operating a nuclear power reactor.

The firm will spend \$100,000 in a year-long study of technology already compiled in order to determine the engineering and economic practicability of designing, constructing and operating an atomic power reactor and to determine what further research will be necessary before construction can be started.

MAGNESIUM *Continued*

Another growing portion of magnesium output will have to be earmarked for titanium reduction. This will slow with more complete recycling of magnesium by the titanium producers.

With Russia breaking blood vessels to promote output of the light metal and incorporate it in military equipment, and now equalling U. S. output, fabricators are wondering why we move with increasing slowness. Particularly when at least one Air Force study leaves no doubt that guided mis-

siles can be produced economically using large magnesium castings in building up the fuselage, and since additions of beryllium and other metals wipe out the flammability handicap that has long dogged the metal. And at least one test indicates an all-magnesium airfoil can be produced to outperform aluminum.

The dilemma—6200 tons of magnesium per month seems too much—2500 tons per month not enough.

Defense Secretary Wilson may

keep Velasco running by officially calling it essential to national defense. If that is done, the plant would probably be re-leased under the same arrangement whereby GSA would continue to take excess even if the stockpile goal is filled.

If Justice Dept. reverses itself and permits Dow to buy the plant, then it will have to dispose of surplus as best it can unless the government agrees to buy all or part of the output. This is termed "not unlikely," though GSA won't say.

CORRECT !



in the classroom!



**APEX
TOOLS**

CORRECT !



in the tool room!

If a \$2.00 tool must be replaced every six months, tool costs on that job total \$4.00 a year. If, on the other hand, a \$3.00 tool will give a full year of service, you'll get \$4.00 worth of tool service—and save \$1.00 a year on tool costs as well.

In the very simplest terms, that's the reason why Apex tools are preferred for production nut running operations. Designed specifically for continuous, heavy-duty use, Apex tools cost a little more in the beginning, a lot less in the end.

Apex tools are precision-built of high carbon electric furnace alloy steel, cold broached and heat treated to withstand the severe shocks of impact service. That's the reason your tool costs will be lower when you ask for Apex nut running tools. Choose from more than 5,000 stock types and sizes of impact sockets, extensions, adapters, universal wrenches. If your requirements are special, send sketch or blueprint—we'll do our best to help you.

CATALOG 29—Specifications, drawings, illustrations of the complete Apex line of nut running tools. Write, on your company letterhead please, for your copy.

impact sockets, extensions, adapters

THE APEX MACHINE & TOOL COMPANY
1029 S. Patterson Blvd., Dayton 2, Ohio

POWER BITS, INSERT BITS AND BIT HOLDERS, FOR PHILLIPS, FREARSON (Reed & Prince), SLOTTED, CLUTCH HEAD and SOCKET HEAD SCREWS • HAND DRIVERS FOR PHILLIPS, FREARSON AND CLUTCH HEAD SCREWS • TWO-PIECE DRIVERS FOR HEX HEAD SCREWS • SOCKETS, EXTENSIONS, ADAPTERS AND NUT SETTERS • UNIVERSAL SOCKETS, EXTENSION WRENCHES AND ADAPTERS • AIRCRAFT AND INDUSTRIAL UNIVERSAL JOINTS • SELF-RELEASING AND ADJUSTABLE STUD SETTERS • SAFETY FRICTION TAPPING CHUCKS • VERTICAL FLOAT TAPPING CHUCKS.

November 25, 1954

"From welding studs



to speaker bolts



we

get it fast from AMERICAN!"



On-time delivery is only part of the job here at American. Just as important to you is the price you pay for every fastener.

We don't pretend to be miracle men. But on many a job, we have been able to provide the happy combination of good delivery and a lower cost per unit.

Try us. Send us prints of your fasteners. Tell us how many you need. We'll do the rest, at no obligation to you.

To reduce your assembly costs, to avoid the "slips" that can ruin any fine finish . . . ask for prices of American Phillips Screws.

X marks the spot
. . . the mark of extra quality

AMERICAN SCREW CO.

PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT

Plants at Willimantic, Conn. and at Norristown, Pa.
Warehouse and office at Chicago
Office, Detroit, Michigan



Report To Management

Watch for Christmas business to set an all-time record this year, topping even the '47-'48 spending spree. And even if you don't make neckties, walking dolls, bicycles or electric trains, a big spending splash can't help but ripple back to you.

It may seem strange that in a year of moderate recession, with unemployment running higher than it has in several years, that we could be in for a "big tree" Christmas. But the indications are that it's coming:

(1) The consumer is confident. By and large he's been more confident all year long than businessmen, economists or government officials. And the business upturn that started in September can't help but make him feel even more secure.

(2) He has the money. Savings are high, including record level Christmas Club accounts; wages average \$71.86 per week—tops for the year—and are still moving up. Credit is easy. Installment buying has been holding at a substantial level but not enough to discourage new indebtedness. And the tax cut is making paychecks go farther.

(3) The big industries—automotive, steel, construction—are all uptrending. This means a lot of fat pay checks will be cashed in between now and Christmas.

(4) Despite the fact that pay rates have been climbing, prices have remained remarkably steady (Consumers' Price Index has risen only 0.3 pct this year). This means the wage hikes really have served to increase consumer purchasing power.

There are also a couple of fringe factors that could be important in making the consumer spend just a little more than he originally intended: this year's record 4.1 million baby crop means "first Christmases" in many homes. Parents, relatives will be going all out. And for a lot of husbands and sons it will be

the first Christmas they've spent at home since coming back from Korea.

But don't forget that expectation of a record Christmas is not the general view. Result is that many businessmen will be caught short on stock when business tops what they anticipated. This means a lot of orders will have to be placed right after Christmas.

You can figure the recent election has increased the chances that Ike will run again in '56, even though he is probably less enchanted with the job of being top dog than anyone since Coolidge.

But despite his personal inclinations there will be a lot of pressure on him. Those close to him will tell him confidentially that only he can prevent the Democrats from taking over; that he owes it to all those who have worked so hard for him to run again; that all the good he has accomplished during his 4 years will go down the drain unless he stays in to finish his program.

These will be extremely difficult arguments for as conscientious a man as the President to disregard.

Our economy has grown so fantastically and the figures we use to measure it by are so great that to most people they really have little meaning. You hear that Gross National Product in the third quarter was running at an annual rate of \$356 billion, that construction volume this year may hit \$37 billion, that the most recent report showed inventories of business firms were valued at \$78 billion. For most of us, these figures are beyond comprehension.

It's when you find out that a firm like General Electric has been investing an average of more than \$190 a minute day and night since World War II on expansion that you get some idea of the tremendous pace our economy has been setting

INDUSTRIAL BRIEFS

West Coast Section . . . Association of Iron & Steel Engineers has organized a West Coast Section designed to keep its members abreast of new developments in the industry and to broaden their knowledge of various stages of steel mill operation. W. A. Marshall, works engineer, U. S. Steel's Pittsburg, Calif., plant, Columbia-Geneva Steel Div., has been elected chairman.

Distributor Named . . . General Electric Co.'s Carboly Dept., Detroit, has named Central Mine Supply Co., Mt. Vernon, Ill., as an authorized mining tool distributor.

Contract Signed . . . Electro Metallurgical Co. of Sheffield, Ala., and the United Steelworkers of America have signed a new two-year contract that includes a general 5¢-per-hour wage increase.

Dividend . . . Republic Steel Corp. declared a regular quarterly dividend of \$1.12½ per share on the Common Stock, payable Dec. 21 to stockholders of record Dec. 1, 1954.

"Grand Award" . . . National Tool & Die Manufacturers Assn. was presented with a "Grand Award" for outstanding public service, based on its development of an apprenticeship training program.

Winners All! . . . Six winning students in the Annual Student Contest sponsored by the American Institute of Chemical Engineers will receive their awards at the Annual Meeting Dec. 14. John A. Quinn won first prize, second prize winner was John W. Klar, third prize went to Robert B. Grady. Honorable mention went to: Frank H. Helm, Edward Boruk, and James D. Hanchette.

Elected . . . The Gray Iron Founders' Society elected C. H. Ker as its president at its Annual Meeting at The Homestead, Hot Springs, Va., recently. Mr. Ker is president of The Dalton Foundries, Inc., Warsaw, Ind.

Plant Opened . . . International Business Machines Corp. opened a new 139,200-sq-ft plant completely devoted to heat treating, plating and plastic molding operations in Endicott, N. Y.

Well Done! . . . Plume & Atwood Mfg. Co., Waterbury, Conn., received a special citation from the U. S. Treasury Dept. for the company's outstanding record during a recent Savings Bond campaign among its employees.

Factory Opened . . . The Foxboro Co. officially opened a new instrument service and assembly building in San Leandro, Calif., early this month. The new factory has more than doubled the company's West Coast manufacturing facilities.

Director . . . J. S. Besser, manager of fuel sales, The Colorado Fuel & Iron Corp., was elected director of the National Coal Assn.

Research Center . . . Eimco Corp. has opened a new Research & Development Center at 301 S. Hicks Road, Palatine, Ill.

Joins Institute . . . Can Manufacturers Institute, New York, has named John Dingee as general manager of the Marketing Bureau.

Tourists . . . Oneida Ltd. played host to the Syracuse Chapter of The American Material Handling Society last week. Kenneth G. Freeman, supervisor of plant layout for the company and a director of the Society, was official host for approximately 75 members.

Expanding . . . Pacific Tube Co., Los Angeles, broke ground for a \$200,000 expansion of its stainless steel tube pickling facilities recently. New facilities are expected to be in operation by mid-February.

Adds Plant . . . Norton Co., Worcester, will add a new plant in Huntsville, Ala., which will add to its electric furnace capacity. Ground will be broken late this year with completion by the end of 1955.

Safety Mark . . . Employees of Lorain Works, National Tube Div., U. S. Steel Corp., completed more than 4.5 million manhours of work without a lost-time accident to establish a new, all-time safety record.



STRUCTURAL STEEL FABRICATORS

POLLASKY AUTOMATIC SPACERS insure large savings in the fabrication of steel and will cut your costs of punching holes in iron. Rapid punching using only **ONE OPERATOR**. The spacing bars used can be rapidly set and eliminate all templet making and marking of iron. These Spacers operate on forward and return travel allowing angle iron to be punched in both legs at one handling. Simple to operate. These Spacers can be designed to operate with your present punch in any size to handle your range and length of work.

STEEL STAMPING PLANTS

Set up with a blanking press this **AUTOMATIC SPACER** will feed any size or length of plate. A series of blanks can be cut on the forward travel and a new series of blanks cut on the return travel. Can also be used with a shear or saw for cutting off operations. Full automatic operation. Consult us for special applications.

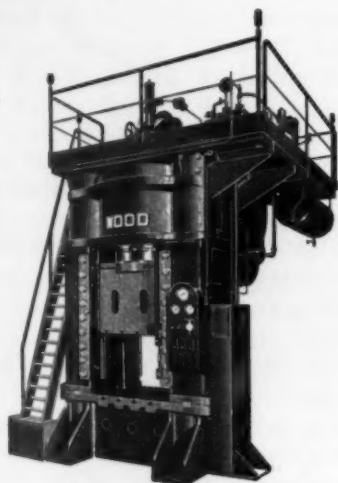
POLLASKY ENGINEERING CO.
3802 N. 38TH STREET
MILWAUKEE 16, WIS.



Ever measure a pinch of salt?

IN METALWORKING, THE PAYOFF'S AT
AN R. D. WOOD PRESS LIKE THIS ONE!

This 2000-ton heavy duty, self-contained hydraulic forming press is used for continuous service on such operations as hot forging, forming, coining and forcing. R. D. Wood hydraulic presses are made in a full range of sizes and capacities, for many uses. Ask for catalog, and for engineering aid—both yours without obligation.



It is to be doubted whether even the most expert chef can tell the capacity of his own pinch of salt. And yet, he has a fine flair for flavor—an art which never fails him. On the other hand, in the business of making capital investment machinery such as hydraulic presses, R. D. Wood Company cannot use the pinch as a means of measurement. We have to rely on highly technical procedures. However, there is an art here which compares with the chef's. It's the art that comes only from having done the same thing many times before . . . sizing up a manufacturer's production need . . . building a press to meet that need . . . and doing the job so well that he never has the same problem again. We're holding an illustrated catalog for you. Please, send for it.



R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities



MAKERS OF HYDRAULIC PRESSES AND VALVES



FIRE HYDRANTS



CAST-IRON PIPE



GATE VALVES



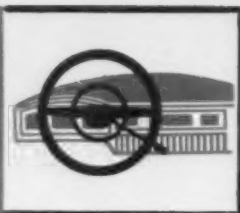
GAS PRODUCERS



ACCUMULATORS



November 25, 1954



Automakers Vie For Defense Business

Military production a critical need for independents . . .

Willys to lose Jeep contract in favor of Ford's improved XM-151 truck

. . . American Motors will build airborne midget—By R. D. Raddant.

◆ IN THE always competitive automotive industry, behind-the-scenes competition for defense business is carried on with an intensity that rivals the current all-out drive for consumer dollars.

It is no secret that defense orders are eagerly sought after, that failure to obtain their share of this diminishing volume of profitable business has been a serious factor contributing to the problems of the smaller companies. Both American Motors and Studebaker-Packard, for example, have primary objectives of regaining defense volume to bolster their financial resources.

Stop Jeep Output . . . Meanwhile, one of the longest and best-known defense arrangements will come to an end June 1 when Willys will lose its contract to build its famous Jeep for the military. Willys, now part of Kaiser Motors Corp. has been making 1000 military vehicles a month, about 12 pct of its total production. Loss of this business will be a major blow to Kaiser, which is still "in a loss position."

It is generally assumed that Ford will take over as the primary supplier of 1/4-ton military vehicles with the Ford-developed XM-151. This vehicle, in a 2-year, government financed program, surpasses the old Jeep with better performance, improved mobility, easier maintenance and much lighter weight. (THE IRON AGE, Sept. 23, 1954, p. 87.)

Build "Mighty Mites" . . . Last week American Motors declared it was out to get a share of the mili-

tary vehicle business with the "Mighty Mite." Rights to manufacture and sell the vehicle were obtained from the Mid-America Research Corp.

The significant factor in back of American's taking over the Mite is that American has just about completed development of a 4-cylinder, air-cooled engine of diecast aluminum. Originally, the Mite was powered by a German-built Porsche engine. This prevented the Mite from being practical from the military point of view until a domestic company could produce the engine. George Romney, American president, says the new engine is definitely satisfactory and is "nearly ready for production."

Is Airborne Vehicle . . . The Mite's light weight makes it attractive for airborne utilization.



We have all our blank drawing paper so stamped."

Its weight is 1496 lb compared with the XM-151's 2140 lb and the Jeep's 2720 lb. It is a smaller vehicle, but will carry a creditable load and will make 57 mph.

Responsibility for the development of the new vehicle has been given to the Hudson Special Products Div. of American. It is the intention of the company to utilize Detroit Hudson facilities as American's defense production division. All Hudson assembly and most manufacture has now been transferred to American's Wisconsin plants where Hudson and Nash cars will be built from the same basic body in the same plants.

Experienced Producer . . . American executives believe that experience with small car production—Rambler and Metropolitan—should give them an advantage in producing a vehicle of the Mite's type. No orders have been placed as yet, either for Mite or XM-151.

Also in the military section of the automotive world, Chrysler has developed an "idea" truck. It was constructed with deliberate use of the lightest possible materials and design. Not intended for volume production itself, its features have influenced design of vehicles that are headed for volume production.

The Chrysler T55 is a cab-ahead-of-engine 2 1/2-ton truck with six wheel drive. It weighs only 9000 lb compared with 14,000 lb for a conventional Army truck of the same size.

Body and cab are aluminum as are wheels and axles. Each wheel has torsion-bar suspension with disk brakes operated by an air assisted hydraulic system.

for transportation equipment
that stands up...



FLAT-ROLLED STEEL

produced by a specialist

The kids who roll down Oak Hill in a coaster wagon, and those of us who ride in the world's best automobiles, put a lot of faith in flat-rolled steel.

If you use flat-rolled steel in your products, rely on a specialist—Great Lakes Steel. Our entire organization is devoted to the business of making more and better flat-rolled steel for every application. Many manufacturers have found we have some unique qualifications to help them to improve products and reduce costs. We would like the opportunity to work with you on your problems.

Call on our 25 years of specialization in flat-rolled products. Our representative will be glad to discuss your particular needs at your request.

Great Lakes Steel
Ecorse, Detroit 29, Michigan

PRODUCER OF N-A-X HIGH-TENSILE STEEL

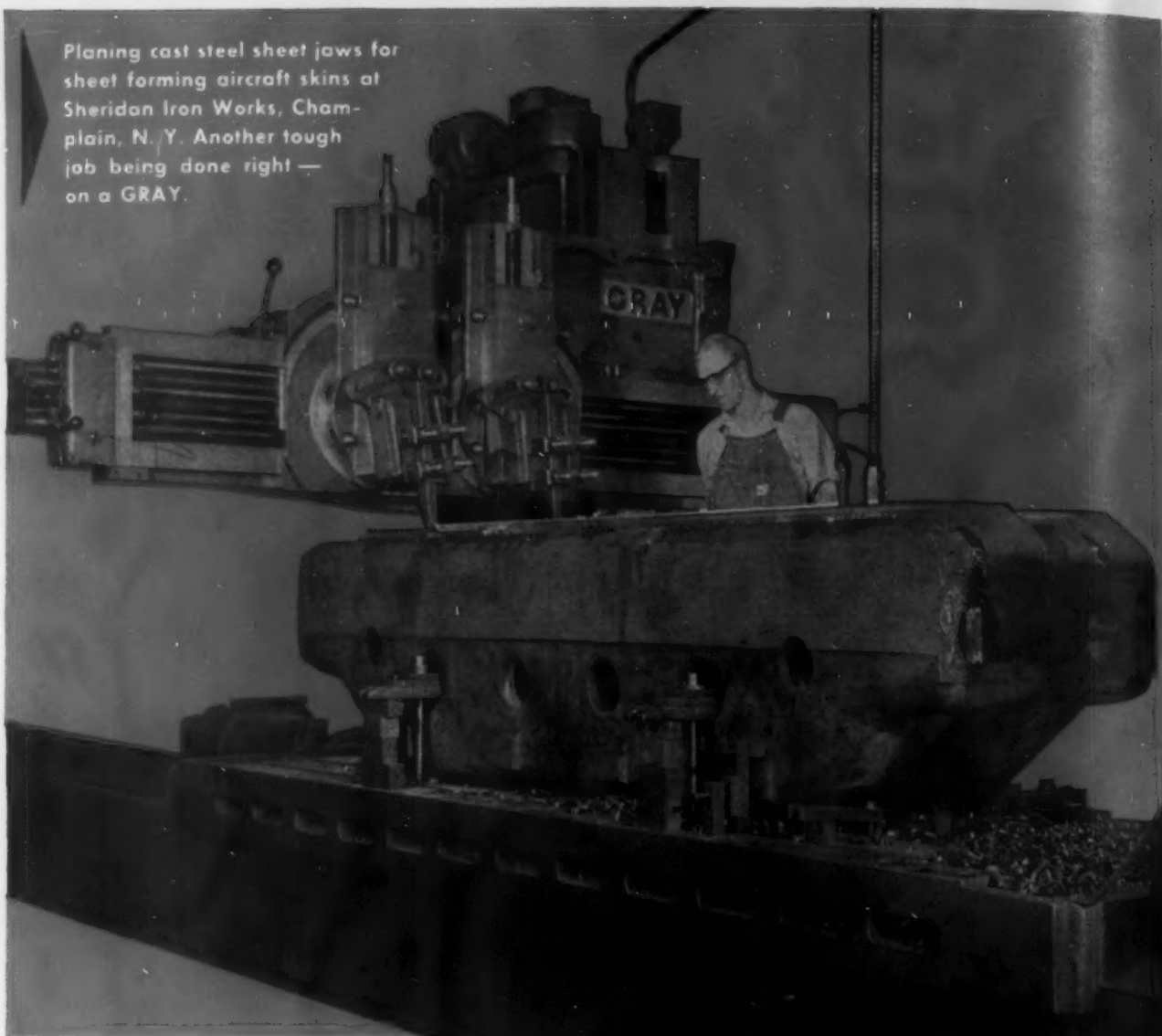


UNIT OF
NATIONAL STEEL CORPORATION

SALES OFFICES IN CHICAGO, CLEVELAND, GRAND RAPIDS, INDIANAPOLIS, LANSING, NEW YORK AND PHILADELPHIA

November 25, 1954

Planing cast steel sheet jaws for
sheet forming aircraft skins at
Sheridan Iron Works, Cham-
plain, N. Y. Another tough
job being done right —
on a GRAY.



400%

... production increases can be obtained through carbide
planing with a **GRAY** heavy duty **OPENSIDE PLANER**

Write today. Get
the story on GRAY

HIGH
low cost
PRODUCTION

Dept. C

... reports the Sheridan Iron Works, Champlain, N. Y. where
a line of GRAY openside planers are delivering high production at low cost.

Everywhere, the odds are constantly increasing in favor of the GRAY.

Its astonishing rigidity permits heavy hogging with precision finish cuts.

Its openside design means "plus" value capacity, greater versatility.

Get the benefits of substantial savings in time and money with a
GRAY heavy duty openside planer.

The G.A. **GRAY** *Company*

planers • milling planers
planer type milling machines
horizontal boring machines

CINCINNATI 7, OHIO, U. S. A.

SOLD IN CANADA BY UPTON, BRADEEN AND JAMES, LTD. • SOLD IN LATIN AMERICA BY MACHINE AFFILIATES

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Nov. 20, 1954.....	133,676*	23,405*
Nov. 13, 1954.....	118,972	22,182
Nov. 14, 1953.....	96,836	18,912
Nov. 21, 1953.....	83,326	25,403

*Estimated. Source: Ward's Reports

Exports:

Ship more autos, trucks overseas from Detroit.

While the full scale St. Lawrence seaway is still in the planning stage, automakers are making use of the present limited waterway for exports.

It doesn't amount to astronomical figures yet, the tonnage of automobiles that are exported from Detroit through the Great Lakes and St. Lawrence river. But a respectable number of cars do reach Europe by that route.

A spokesman for the Port of Detroit says that Chrysler Corp. utilizes the St. Lawrence route to a fuller extent than any other automaker. Chrysler ships about 14 pct of its export car and truck production through the Port of Detroit, still not a particularly heavy percentage. Other automakers are also increasing their exports from Detroit, according to Port officials.

Use Small Ships

From Detroit, cars, trucks, accessories and parts go out on small ships that might average about 258 ft in length. They go to France, Finland, Sweden, Norway, Denmark, Holland, Belgium, Portugal, Italy, England, and other European and African ports.

Most Chrysler cars sent out by ship are loaded disassembled and packed in kits. Baltic countries always take their cars knocked down, while cars destined for France are shipped assembled.

Dodge Was First

Going back into company history, Chrysler discovered that the first load of cars sent out of Detroit bound for foreign destination was a shipload of Dodge cars in 1923.

Port authorities privately have stated that auto companies have not used facilities to best advantage, but interest is growing.

When the seaway is improved to handle large cargo ships, Detroit will probably become the major port for handling export cars.

Rambler Basic Car

The 1955 Rambler will become a basic volume car for both Hudson and Nash dealers. This new marketing arrangement, growing out of the Nash-Hudson merger, is a new merchandising concept that will be unique in the industry.

American ultimately plans to produce a separate series for each division, keeping them distinctive in appearance although built on the same body shell. The new program will automatically double sales and service outlets for the Rambler and is hoped will produce at least double sales results.

New Mercury Line

Big news from Mercury for 1955 is the addition of an entirely new car, the Montclair. A lower, more powerful car than either the Mercury or Monterey lines, the Montclair is a result of Ford's program of expanding each line to embrace larger segments of the market.

AUTOMOTIVE NEWS

Mercury's two new engines will develop 188 and 198 hp compared with the 162 hp of the 1954 car. Although the 1954 engine was completely new, Mercury uses a new cylinder block and head this year to keep up with the horsepower parade.

All Lines Lower

Principal styling feature of all Mercury lines is the wraparound windshield. All cars are lower than previous models, with the Montclair 2½ in. lower. Canted headlights give a leaning forward effect to the lower, wider front, while the rear quarter panel has a more passive appearance.

Few Price Changes

Prices of most 1955 cars have now been established, with little change from the 1954 pattern.

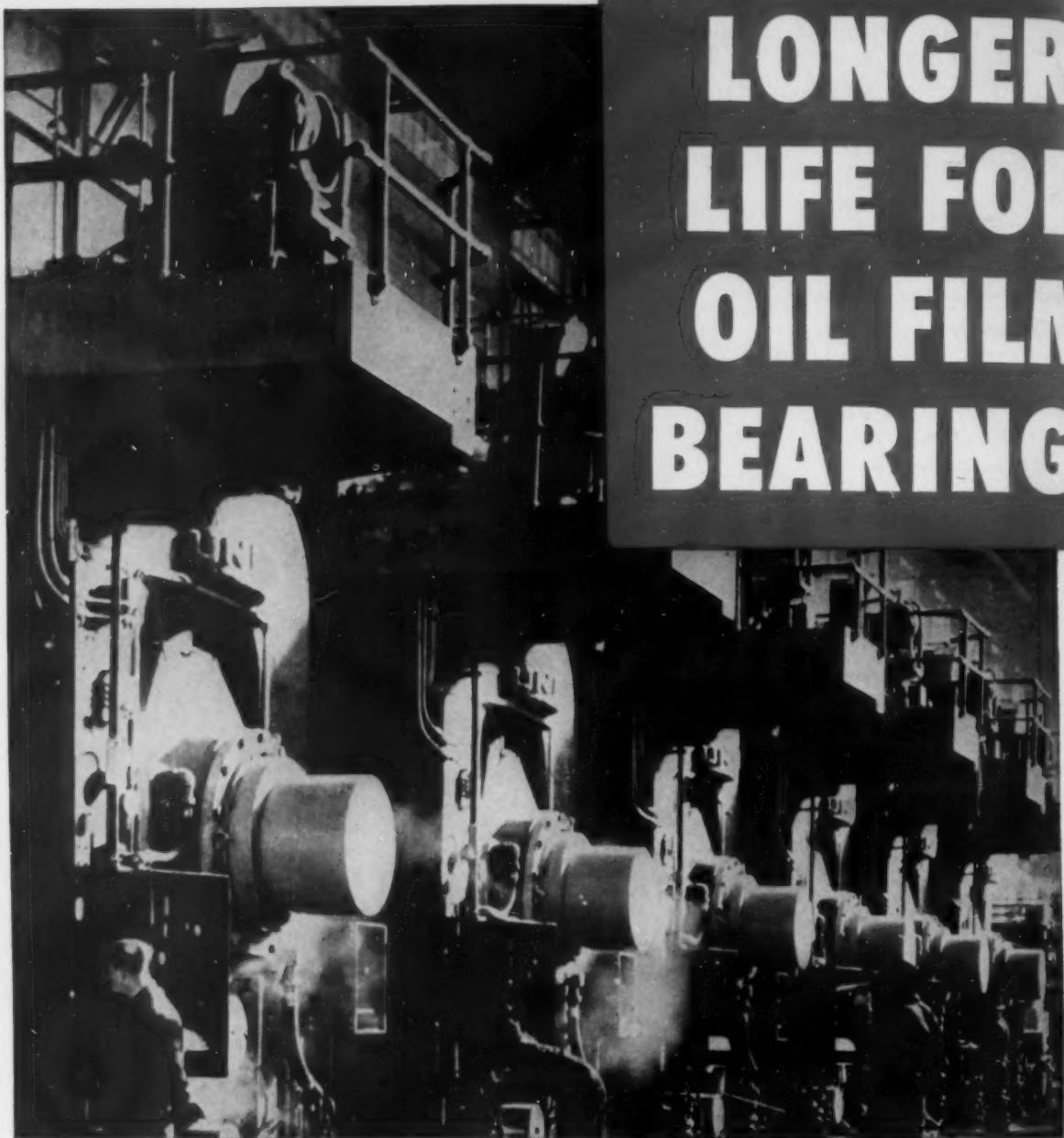
The most significant change does not come from the actual cost of the cars, but from the change in transportation and delivery charges that has been made by Ford and GM principally.

THE BULL OF THE WOODS

By J. R. Williams



LONGER LIFE FOR OIL FILM BEARINGS



WITH *Texaco Regal Oil*, oil film bearings on back-up rolls operate at greater efficiency, cost less to maintain, last considerably longer. *Texaco Regal Oil* in your circulating system assures a steady, uninterrupted flow of sturdy lubricant that keeps bearings clean and protected and oil lines clear.

Texaco Regal Oil is a heavy, turbine-grade oil. It resists oxidation, emulsification and sludging. Especially developed for continuous rolling operations, *Texaco Regal Oil* separates quickly and easily from water... assures trouble-free performance and lower maintenance costs.

To raise the efficiency of enclosed reduction gears, use *Texaco Meropa Lubricant*. It has outstanding EP stability, extra resistance to oxidation, thickening and foaming.

A Texaco Lubrication Engineer can help you increase output at lower unit cost. Find out how by calling the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

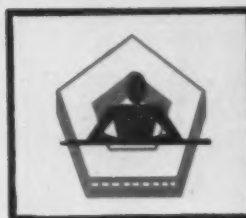
The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO Regal Oils

(HEAVY CIRCULATING OILS)

TUNE IN . . . TEXACO STAR THEATER starring DONALD O'CONNOR or JIMMY DURANTE on television . . . Saturday nights, NBC.



THIS WEEK
IN
WASHINGTON

Unions Fear No Taft-Hartley Change

Labor leaders are afraid coalition of Southern Democrats, Republicans will stop any improvement for unions in Taft-Hartley law . . . Government set for stiff fight on Bethlehem-Youngstown merger—By G. H. Baker.

♦ **LABOR UNION BOSSES** publicly talk brightly of winning "important" Taft-Hartley revisions from next year's Democratic-controlled Congress, but in private they talk quietly and grimly of "working like hell to save what we've got."

Although the AFL, the CIO, the railway brotherhoods and other labor organizations spent more than \$500,000 to elect a Democratic-controlled Congress, spokesmen for these groups predict with a certain degree of bitterness that the new Congress won't revise the Taft-Hartley law to their liking nor will it vote any major legislation of benefit to labor.

Swallow Bitter Pill

Says the *United Mine Workers Journal*: "It is best not to engage in too much wishful thinking about the new Congress.

"All signs point to the same coalition of conservative Southern Democrats and Republicans running things on Capitol Hill," the mine workers' paper observes.

One bitter pill for unions to swallow is that the prospective chairman of the powerful House Labor Committee is Rep. Graham Barden, D., N. C., who, as the AFL puts it, "has a 100 pct voting record against the interests of trade unionists." Labor lobbyists speak quietly about plans to dump Mr. Barden by putting him in charge of an "education" committee of the House, and promoting Rep. Augustine B. Kelley, D., Pa., to the chairmanship of the Labor Committee. Mr. Kelley wants to see the unions get what they want in the way of legislation.

Government trust-busters, irked by talk that Bethlehem Steel and Youngstown Sheet & Tube plan to proceed with their merger plans, are mapping plans for a grim, last-ditch fight to stop the proposed combination.

The Department of Justice has given its informal opinion to the effect that the proposed merger would result in less, not more, competition in the sale of steel products made by Bethlehem Steel and Youngstown Sheet & Tube.

Attorney General Brownell declares bluntly that if the two firms attempt the proposed merger, the government will "file a big case, and soon."

Drop Bootleg Check

The government's antitrust lawyers are basing their contention of illegality on Section 7 of the Clayton Antitrust Act. That section bars any company from buying either the physical assets or the stock of a competitor if such a move would result in less competition.

Congressional plans to dig deeper

into "bootlegging" of automobiles are fading rapidly because cut-rate peddling of new cars is diminishing, Senate and House members of investigating committees are finding out.

Senator William A. Purtell, R., Conn., has called off his bird dogs, and says now he will hold no more hearings on alleged auto "bootlegging" practices.

This doesn't mean that anti-bootlegging legislation is dead. Its curiosity having been aroused, Congress is going to keep a close watch on auto marketing practices, and will move much faster in the future when retail car markets soften and cutthroat competition crops up.

Blacklist 20 Firms

Firms holding government contracts that do not measure up to prescribed wage and hour standards are headed for trouble, Labor Secretary James P. Mitchell warns. He promises "vigorous" action against contractors who "break down hard-earned labor standards, cheat their own workers, and place fair bidders at competitive disadvantage."

In fiscal 1954, 20 firms were blacklisted from doing business with the federal government, as compared with only four during the 17-year period 1935-1952.

Aid Mining Machinery

Export-Import Bank is helping U. S. exporters finance credit sales of mining equipment to foreign purchasers and guaranteeing payment in case of credit or political loss in an effort to pull the industry out of a slump.

Turn Page



**you get easy, quick,
economical production**

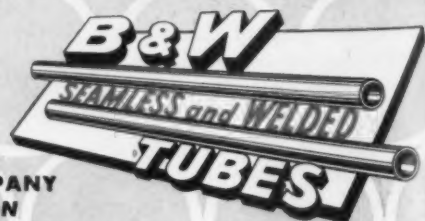
of your parts with



**because it has
in every foot the**

desired uniform properties

**for
EFFICIENT EXPANDING,
SWAGING, BENDING, MACHINING**



**THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION**
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

TA-4035 (CWM)

Representatives of the industry are telling government officials that delays in processing credit arrangements for exports must be eliminated and red tape removed to prevent loss of sales to exporting firms in other countries.

The industrialists also asked the Commerce Dept.'s Business & Defense Services Administration to work on aid for the depressed coal mining industry and suggested a quota be placed on imports of residual fuel oil which is displacing "about 50 million tons of coal a year" for heating purposes. They suggested that greater allowances for depreciation of mining machinery be considered in any future review of the tax structure.

Business:

Next year will be better than '54, won't match '53.

Business in 1955 will be slightly better than 1954, not as good as 1953, and the recent elections won't alter the course of the business upturn—that's the picture as government economists see it. (See THE IRON AGE, Nov. 18, 1954, p. 95).

Personal income will better this year's rate; savings are near peak so more money will be spent, less saved, than this year; construction will top 1954's record performance, and industrial activity will continue to improve bringing higher employment and wages.

What Survey Shows

A post election legislative summary shows:

Money—The administration will continue to try to cut spending and balance the budget, but Congress will lean toward more spending so there will be little change.

Labor—The Taft-Hartley labor law won't be changed much, if at all.

Wages—A drive to increase minimum wages and to remove the current exemptions is gaining favor.

Policies favoring expansion of business will continue, but any new tax cuts will favor individuals rather than business, providing more spending money. Easy money policies will continue.

Booklet on Ordnance

Abstracts of 644 government-owned patented inventions relating to military ordnance have been published by the Small Business Administration in a new booklet titled "Ordnance." It is the fourth booklet of patent abstracts.

The booklet is available for \$2 from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.

Discounts Spreading

Discount selling is becoming increasingly important to hardware dealers as competition is tightened by other factors.

Survey by the U. S. Chamber of Commerce shows that 70 pct of all retailers are now faced directly with discount competition. Fifteen pct of them are cutting their own prices to meet it. About 40 pct are pressing suppliers for price treatment equal to that afforded discounters.

Discount selling, concentrated in sporting goods, building materials, paint, plumbing supplies, will be expanded in the months ahead to cover even more hardware items.

Plot Chemical Growth

Chemical industry expansion in the past 12 months represents private investment of more than \$1.216 billion in construction, a new Manufacturing Chemists' Assn. survey shows. And there's another \$1.514 billion under construction.

In addition, there is an estimated total of \$3.360 billion government-

WASHINGTON NEWS

financed chemical construction now underway or planned.

Investors:

Government moves to protect overseas investments.

Simplified rules newly issued for the government's program of insuring private American capital investments abroad are designed to convince the businessman that he will be able to collect his just returns on the dollars he puts into foreign enterprises.

This investment guaranty plan will give both "convertibility insurance" and "expropriation insurance" to the U. S. investor. It is not intended to offer protection against normal business risks.

What Plan Does

In its new form, the guaranty plan provides that:

(1) The investor may insure his capital for a flat amount applicable over the life of the contract.

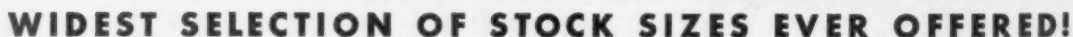
(2) Insurance protection will not decline in amount as a result of withdrawals of earnings through normal exchange channels.

(3) The insurance fee, no longer on a formula basis, is now a flat .5 pct annually of the face amount of the policy.



CANADIAN defense officials, C. D. Howe, left, Minister of Trade, Commerce and Defense Production, and R. O. Campney, right, Defense Minister, meet with U. S. Secretary of Defense Charles E. Wilson, center.

**Ask your SIMONDS
DISTRIBUTOR for a copy
of this New Chart (18" x 31")
giving full range of Stock
Sizes now available**



Now you can get HUNDREDS OF NEW STOCK SIZES of Simonds high-grade, precision-ground tool and die steel . . . sizes that save you more time and money . . . sizes that formerly were special but now are available from stock at regular prices. Now you can get "1001 sizes for 1001 uses" . . . with your choice of OIL or AIR Hardening type steel in 18" and 36" lengths.

OIL HARDENING TYPE — Non-deforming, spheroidize-annealed for best machinability and consistently uniform hardenability — from Simonds' own steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. Individually packaged (18" and 36" lengths) with simplified heat treating instructions.

AIR HARDENING TYPE — Non-deforming, spheroidize-annealed, 5% chrome — more wear-resistant yet easy to machine and heat treat with uniformly excellent results — another product of Simonds steel mill. Decarburization and surface defects removed. Wide hardening range. Individually packaged with heat treating instructions.

Get full information . . . **NEW WALL CHART** . . . and Immediate Delivery . . . from **YOUR SIMONDS DISTRIBUTOR**

FITCHBURG, MASS

FLAT GROUND

DIE STEEL

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon • Canadian Factory in Montreal, Que.
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y. • Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada



West Maps Industrial Expansion

Fast-growing markets in Western states spur growth of metalworking firms . . . Steel, aluminum, machine tools, electronics, automotive and aviation are leaders . . . Hydro-electric power will meet needs—By R. R. Kay.

♦ CHAPS, spurs, lariat, and saddle symbolize the "Old West." But today, cleared acres and rising factories are the new look of the West. It is making a rapid, dynamic rise to industrial maturity.

THE IRON AGE "Salute to the West" in this issue tells why western industrialists are realistically bright-eyed about future markets (see p. 117).

"A market is a man with a buck in his pocket." That is what the West offers industry—men with dollars. On-the-ball sales managers can profitably use this list of new and expanding plants for their metalworking products, equipment and services:

Pacific Tube Co., Los Angeles, manufacturers of steel tubing and bars, will double stainless steel pickling facilities in a \$200,000 expansion. Completion expected next February . . . **Victor Equipment Co.,** San Francisco, invests \$200,000 in new welding rod manufacturing plant for its Alloy Rod & Metal Div., Whittier, Calif. . . .

Kaiser Steel Corp., Oakland, Calif., expands its Fontana works, upping electrolytic tinplate production, plate and hot-rolled sheet capacities . . . **Leach Corp.,** Los Angeles, manufacturers of electrical equipment, will build new 700,000 sq ft plant to house its four divisions, to cost about \$3 million . . . **Oregon Saw Chain Corp.,** Portland, Ore., is building 68,000 sq ft plant to make saw chains—estimated to cost \$275,000.

Harvey Aluminum, Torrance, Calif., installing an 8000-ton and

two 4000-ton capacity forging presses, part of a \$2-million expansion program . . . **Defense Products Div. of U. S. Electrical Motors, Inc.,** erecting 125,000 sq ft plant at Anaheim, Calif., to produce aircraft electric motors . . . **Columbia-Geneva Div. of U. S. Steel Corp.** will build multi-million dollar steel pipe plant and a large ammonia plant at Geneva, Utah.

Byron Jackson Co., Los Angeles, manufacturers of pumps and oil country goods, will build 100,000 sq ft plant near Los Angeles for electronics products . . . **Kaiser Aluminum & Chemical Corp.,** Oakland, Calif., increased foil operations at its Permanente, Calif., plant, installing 60-in. four-high foil mill.

Norris-Thermador Corp., Los Angeles, will install steel processing equipment for specialized operations not now performed at

local mills. Operation will save freight costs and extra charges . . . **Burg Tool Mfg. Co.,** Gardena, Calif., manufacturers of automatic turret drills, spent \$300,000 on its new 22,000 sq ft plant . . . **R. Hoe & Co., Inc.,** Portland, Ore., is putting up 30,000 sq ft plant to make circular and band saws.

Willys Motors, Inc., Palo Alto, Calif., planning \$500,000 electronics research and development laboratory as designed by Kaiser Engineers . . . **Precision Castparts Corp.,** Portland, Ore., erecting \$200,000 high-alloy castings and shell molding plants of 42,000 sq ft . . . **Bethlehem Pacific Coast Steel Corp.** starts new \$4-5 million Los Angeles fabricating works.

British Columbia authorizing engineering and geological studies for a \$25-million storage dam on Columbia River in Canada. Dam would provide water for downstream power facilities in the U. S. . . . In early 1955 **Universal Metal Products Co.** will open a 40,000 sq ft \$160,000 plant in Bassett, Calif., to make aircraft accessories . . . **Gates Rubber Co.** will spend \$1 million for a 216,000 sq ft warehouse and manufacturing building in Denver . . . **Garrett Corp.'s AiResearch plant** at Phoenix, Ariz., to get \$400,000 addition.

North American Aviation, Inc., Los Angeles, will build a \$10-million propulsion development center for rocket engine manufacture and nuclear physics research.



Announcing... *the* **NEW** **Kearney & Trecker** **3 hp No. 2 — 7½ hp No. 3** **Model CE**

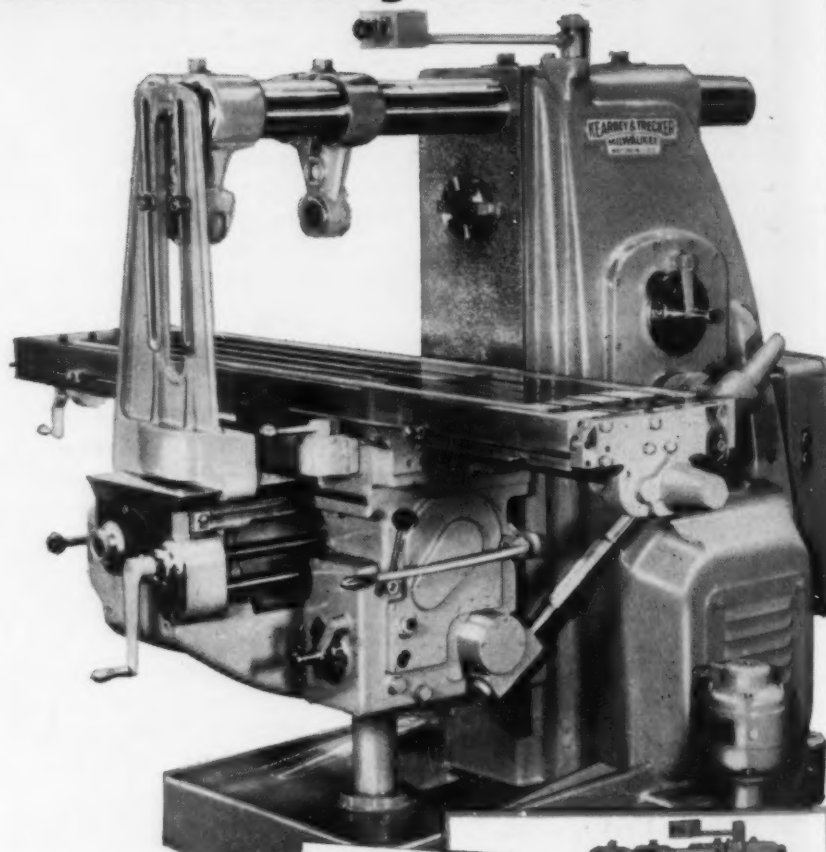
plain and universal milling machines

**Designed specifically
for EFFICIENCY,
EASE and ECONOMY
of operation**

HERE'S Kearney & Trecker's answer to industry's need for a new milling machine that combines quality with *low initial cost*. The new Model CE's give you the three most wanted features — *Efficiency*, *Ease* and *Economy* of operation. What's more, these machines can be obtained under Tool-Lease.

The economical Model CE's are available in either No. 2 (3hp) or No. 3 (7½hp) size — both in plain and universal styles. The CE's feature 16 quick-change speeds (25 to 1300 rpm) and feeds (½ to 25 ipm). They are ideally suited for a wide variety of applications — especially for small tool shops, repair and maintenance shops and vocational training schools.

For the full story, contact your nearest Kearney & Trecker representative, or write: Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.



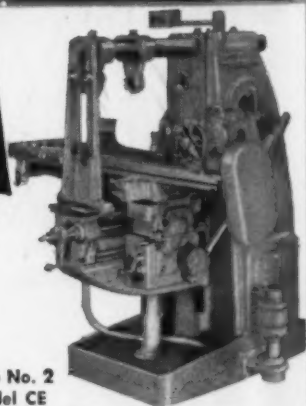
**7½ hp No. 3 Model CE
plain milling machine**
NOTE: Standard equipment
includes choice of only one
arbor support. Overarm brace
available at additional cost.

available for
TOOL-LEASE



FREE CATALOGS!

Ask for complete data on Model CE milling machines, catalog No. CE-10, and for Tool-Lease bulletin, TL-10A. Also see our catalog in Sweet's. Write or call Kearney & Trecker Corp. — Telephone: Greenfield 6-8300.



**3 hp No. 2
Model CE
universal milling machine**

NOTE: Standard equipment includes choice of only one arbor support. Only Conventional Lead Attachment (shown above) is available in Model CE Universal machines. Overarm brace available at additional cost.

Kearney & Trecker Corp.

MILWAUKEE 14, WISCONSIN



Cost Saving Is Builders' Sales Pitch

Machine tool industry can no longer ride defense boom and slump cycle . . . Must woo civilian goods producers for stable, replacement business with a "Modernization Saves Money" theme—By E. J. Egan, Jr.

♦ "MAYBE the machine tool industry needs a catchy singing commercial, or a sure-fire slogan that will do for sales what 'It writes under water' did for ball-point pens." This was one comment heard last week at the National Machine Tool Builders' Assn. fall meeting, held at the Greenbrier.

Theme of the convention was salesmanship; a year ago the meeting focused on ways and means to get more liberal depreciation allowances written into the pending tax bill.

Sales Improve . . . Machine tool sales have perked up this fall after the midsummer slump. But builders don't look for the sales curve to start zooming off the index scale. They know that every point gained is a struggle to get and hold.

It was easy for the industry's shipments to drop this year as once-heavy deliveries prompted by the Korean fighting tapered off. Shipments for the first nine months of 1954 averaged about \$80 million per month, compared

with about \$100 million monthly during the same 1953 period.

To the obvious question, "What do you expect when you run out of war orders?" builders have a ready answer: "We can't let the country get caught with its machine tools down the next time."

Tools Take Time . . . That answer doesn't come out of a crystal ball, either. Any builder can hold up a real-life mirror to reflect his experiences in the last two shooting scrapes. He remembers what so many seem to forget: It takes a long time to make precision machine tools.

The slogan, "Be Patriotic, Buy a New Machine Tool," just doesn't work out very well in peacetime, even a time of uneasy peace. The armed services like the idea, but Congress isn't having any, or at least not more than \$100 millions' worth of the Vance Plan for awhile. Congress wants the Defense Dept. to finish inventorying its machine tool holdings from World War II and Korea before hearing any talk about wholesale buying for the next war.

Won't Stockpile . . . How about the civilian manufacturer? In case of war he'll most likely be making bombs or bullets. Should he buy up-to-date machine tools as a patriotic move so that he'll be ready to roll? Any builder will say it's not likely. The civilian is probably figuring on cost-free delivery by Uncle Sam when the time comes, if it does. Meanwhile, he won't get excited.

H. L. Tigges, NMTBA's outgoing president, tackled the problem of the civilian metalworking plant in his opening address to last week's meeting. He pinpointed these plants as the prime sales target for his fellow builders. And he explained that neither the government nor an appeal to patriotism would displace any of the thousands of obsolete machine tools now wheezing along in U. S. factories.

Sell Savings . . . Tigge's theory: Show the user of outmoded equipment that he's flushing dollar bills away with his metal chips and he'll develop some self interest in up-to-date machine tools.

New NMTBA Officers and Directors



President
M. A. Hollengreen



1st Vice President
Louis Polk



2nd Vice President
Director
J. A. Raterman



Treasurer
J. C. Cotner



Director
H. D. Sharpe, Jr.



Director
P. G. March III

November 25, 1954

Look into REVERE EXTRUDED SHAPES

—it may pay you as it did Westinghouse

When engineers of the Westinghouse Electric Corporation, East Pittsburgh, Pa., designed an inner-cooled generator rotor, the problem of making the hollow rotor coils arose. It was decided to make these out of two channel sections, butted together. Such channels could be made by milling solid copper bar, but Westinghouse knew how expensive such a process is. Could Revere produce the channels by the extrusion process? We thought we could, and after close collaboration with Westinghouse engineers, the various design and extrusion requirements were finalized. The channels are extruded, drawn, annealed, and then given a final draw.

Generators containing these special rotors are cooled by forcing hydrogen through the inner-cooled conductors at 30 psig. Because the heat is picked up directly from the copper, cooling performance is greatly increased over former designs. As a result, generator output can be approximately

doubled without increasing physical size. To put it in other ways, output is increased per pound of generator weight and per pound of fuel.

Extruded shapes can save a great deal of machining time and money, and make new ideas commercially practical. Come to Revere for them in copper and its alloys and aluminum alloys.

REVERE
COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.;
Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome,
N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

SEE "MEET THE PRESS" ON NBC TELEVISION, SUNDAYS

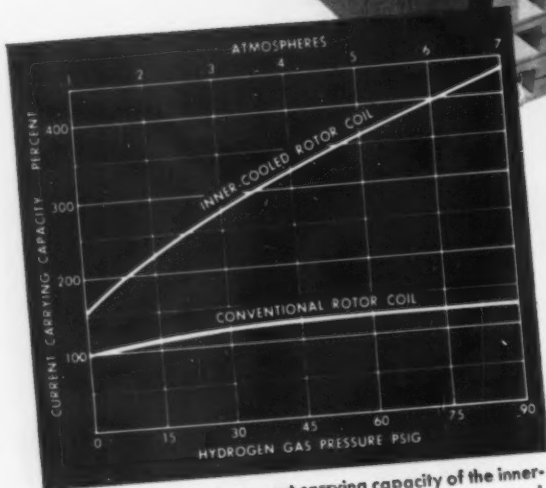
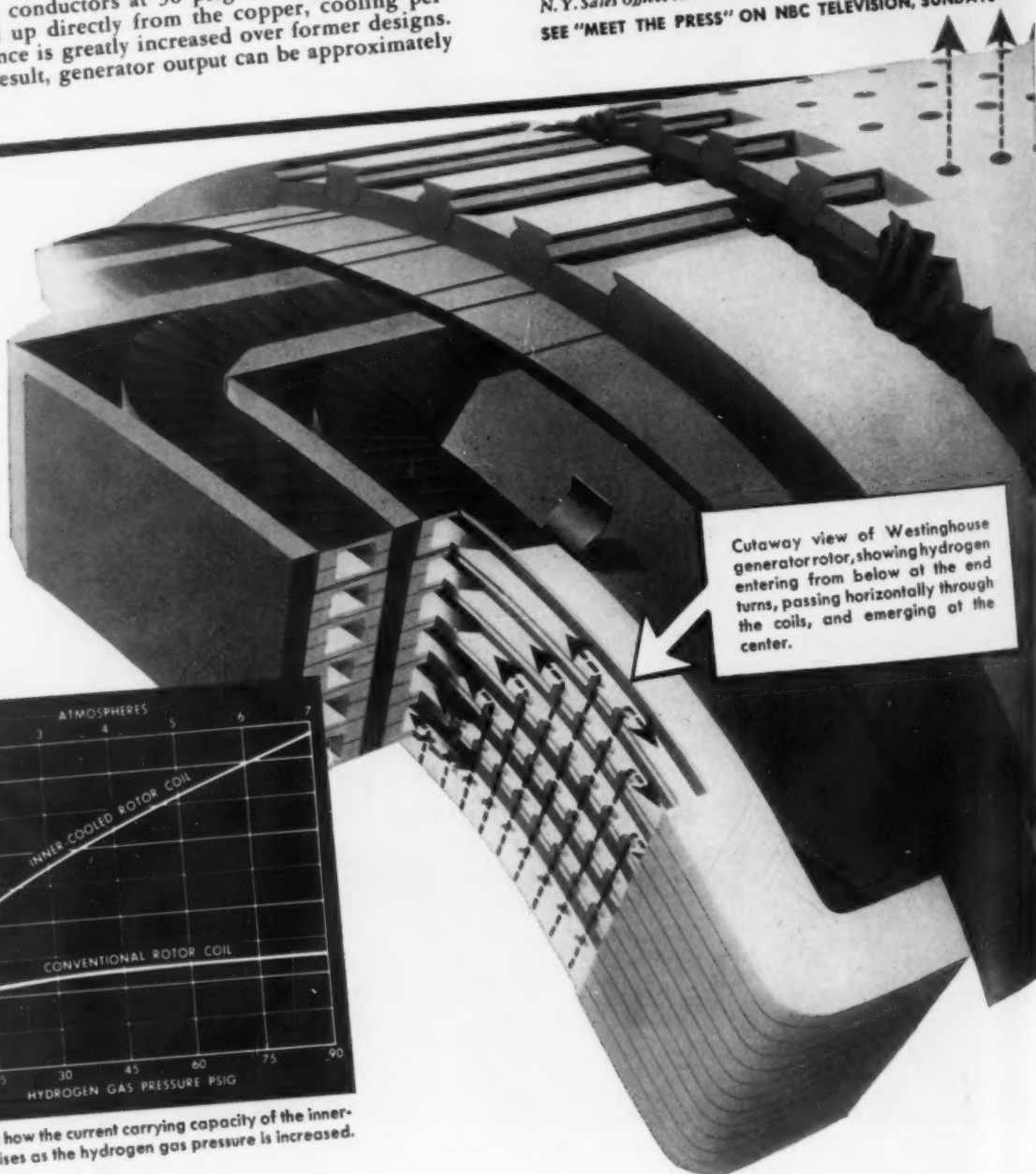


Chart showing how the current carrying capacity of the inner-cooled rotor rises as the hydrogen gas pressure is increased.



The Iron Age

SALUTES

Jay Martin

A "working" vice-president who comes from a steelmaking family, he has applied good housekeeping principles to the plants he supervises and proved that they pay off in top safety and production records.

The women folks think they are the only ones who know how to keep house, but they never heard of Jay Martin, Colorado Fuel & Iron Corp.'s rugged operations vice-president. He's got them all beat.

Jay believes that good housekeeping in a steel plant runs hand in hand with good production records and good safety records. Jay has proved both. And he not only takes care of so-called high-echelon problems but he has a close association with every man in the production departments.

Jay may not have been a pioneer—but he was one of the first to use women in a steel mill and where do you suppose he put them? Right smack in the openhearth department taking care of raw materials and keeping the furnaces in good shape. Seems he thought their methodical habits of keeping groceries on hand and in the proper place would result in the same kind of a job in a steel plant.

Son of a Sparrows Point bessemer superin-

tendent, Jay is one of the C.F. & I. men brought up from the ranks at Pueblo and Denver who now help direct a nationwide operation for the ninth ranking producer.

His first job after attending Lehigh University in Bethlehem, Pa., was third helper in the openhearth department at Bethlehem's Saucon plant in 1916. Later Jay went to the Edgar Thomson plant of Carnegie-Illinois for two years and then to its Youngstown mill where he advanced from first helper to melter.

In 1926 Jay headed west to Pueblo starting as assistant superintendent of open hearths. Ten years later he was elected vice-president in charge of operations and shortly thereafter was keeping the nine plants running.

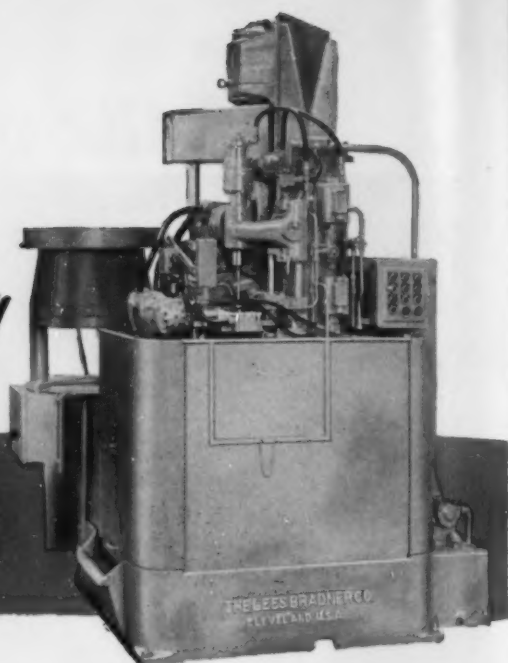
At home things are much more quiet for Jay. He has been married 42 years to his boyhood sweetheart whom he met at school. The Martins' son, Jay, Jr., is an Army captain on leave from General Electric's engineering department.

Automation is here ...from blank to gear!

MODEL 7-A "AUTOMATIC" SINGLE-SPINDLE HOBBER

3" diameter, single-start hob
Runs at 350 R.P.M.
Feeds at .050" per revolution
Hobs two pieces per load

Hobs one gear every 45 seconds
16 teeth in gear
Face width of gear: $\frac{1}{2}$ "
Loading and unloading time: 2 seconds



The famous Lees-Bradner 7-A single spindle hobber has now gone completely automatic!

From blank to finished gear the whole operation is "push-button". Here's how it works:

Blanks are fed from a Syntron Vibratory Feeder down a rack to an automatic pick-up arm or loader.

The loader picks up two blanks at a time and moves them to the hobbing position under an expanding mandrel. The mandrel holds the blanks while the hob moves forward automatically to commence the hobbing operation.

After the gears have been hobbed they are ejected by the loader as it sets the next two blanks in hobbing position.

As a control measure, the machine will not operate if:

- The blanks are not in the loader
- The blanks are not removed from the arbor
- There is not sufficient hydraulic clamping pressure

In the operation pictured the machine is hobbing a pinion gear for an automatic transmission.

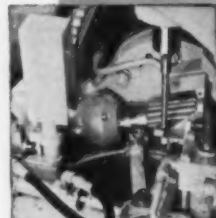
Write to the company for details on this amazing new automatic hobber.



1. Arbor retracted ready for loading.



2. Loader arm moves to right with 2 blanks.



3. Loader about to eject finished gear from under mandrel.



4. Blanks held in place by mandrel ready for hobbing operation.

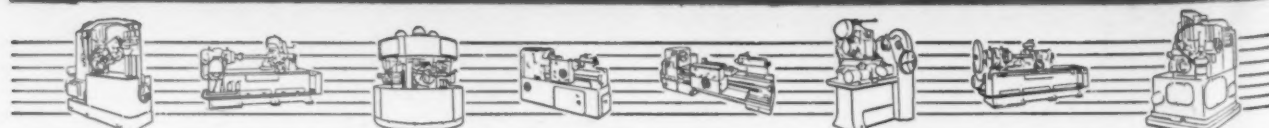
The Lees-Bradner 7-A Automatic Hobber is available in single units or quadruple mountings. (4 machines in line with common base, coolant tank, master control and feeder.)

the

LEES-BRADNER

Company

CLEVELAND 11, OHIO, U.S.A.



MODEL R HOBBER MY THREAD MILLER 7-A ROTARY HOBBERS CRI-DAN THREADING MACHINES MODEL 40 THREAD MILLER 5H SPLINE HOBBER 12-S HOBBER

IF YOU THREAD OR HOB . . . GET A BETTER JOB WITH A LEES-BRADNER

Keeps them stabilized—

Proper Treatments PRESERVE PROPERTIES of Types 321 and 347 Stainless

♦ Types 321 and 347 stainless steels require proper handling if their properties are to be retained . . . Use of high annealing temperatures partially dissolves the stabilizing element—either titanium or columbium.

♦ An allied trouble is surface cracking due to localized carbon pickup . . . Metallic zinc is another source of contamination, particularly if the part is subjected to subsequent stress or heat treatment.

By **HIRAM BROWN**, Chief Metallurgist
Solar Aircraft Co., Des Moines, Iowa

♦ TYPES 321 and 347 stainless steels are used extensively because of their versatility. The two types are similar in many ways and can usually be interchanged without making major adjustments in fabricating techniques. In other respects, these alloys differ noticeably. They are generally considered good alloys to work with, but their use sometimes involves some tough problems.

Both alloys belong to the 18-8 group of stainless steels, but unlike the regular grades of austenitic stainless steels, types 321 and 347 contain additions of titanium and columbium, respectively. When regular 18-8 grades are subjected to elevated temperatures, chrome carbides form at the grain boundaries and the material becomes embrittled and loses its corrosion resistance.

Titanium or columbium combines with carbon to form titanium or columbium carbides or carbonitrides which are dispersed throughout the metal. Such carbides do not rob the grain boundary area of chromium and therefore do not lower corrosion resistance. Since nitrogen may also join with the carbon to form carbonitrides, the amount of titanium or columbium used must

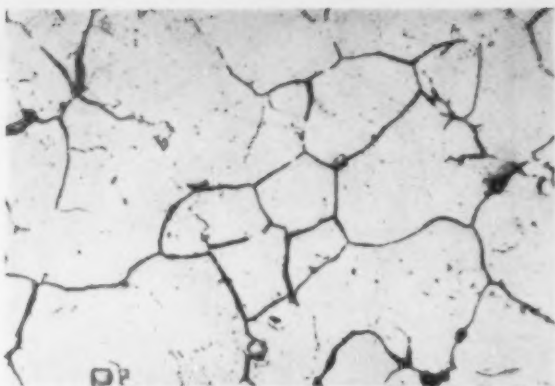
take in consideration both the carbon and the nitrogen present in the steel.

In type 321, titanium content should be at least six times the carbon content. In type 347, columbium content should be at least 10 times the carbon content. Although expressed in relation to carbon content, these ratios take into account the normal amounts of nitrogen which may be present.

Must meet Strauss test

If stainless steels contain these minimum amounts of titanium and columbium, they are said to be stabilized. However, this term is somewhat misleading because types 321 and 347 can become sensitized if not properly handled. Stabilized material should pass the standard Strauss test, yet 321 and 347 sheet, bar stock, castings and forgings have failed during bending or showed intercrystalline attack after the test.

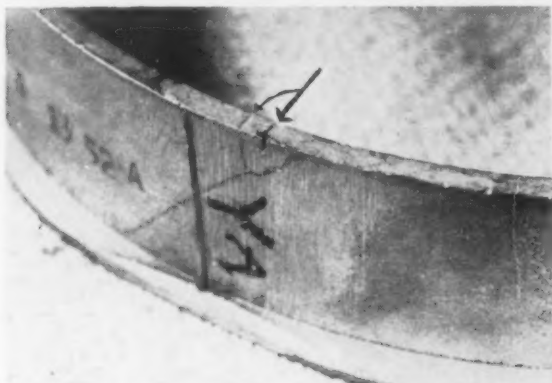
This test consists of heating the material for 2 hours at 1200°F, then immersing it for 48 hours in a boiling aqueous solution containing 100 g of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ and 100 ml of H_2SO_4 (sp gr 1.84) per liter of solution under a reflux condenser. In



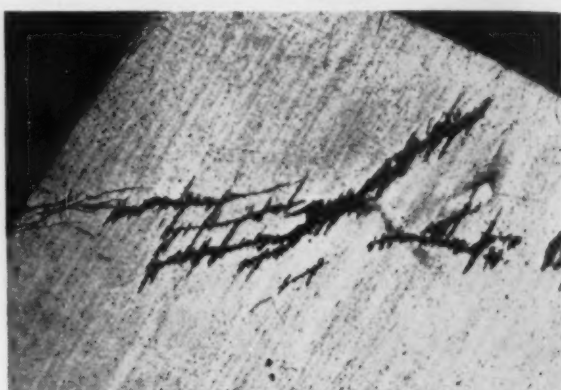
INTERGRANULAR attack occurred in 321 stainless after sensitization and Strauss testing.



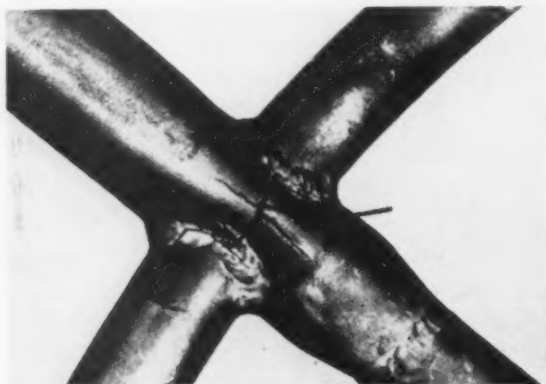
METALLIC ZINC contaminated this 321 bar stock and caused cracking under stress.



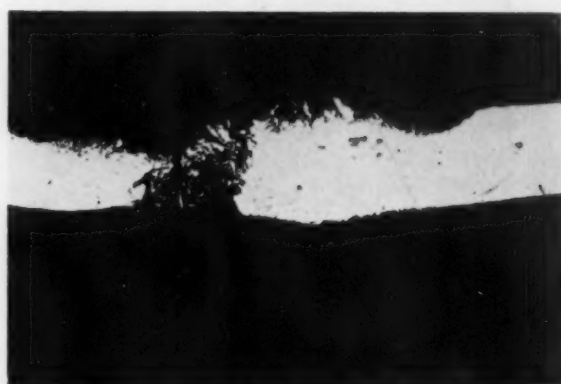
GRINDING perpendicular to the direction of expansion creates a notch effect for cracks.



STRESS CORROSION cracks developed in type 347 from intermittent high-temperature service.



EXCESSIVE CARBON pickup in oxyacetylene welding caused severe cracking in 347 tubing.



TYPE 347 WELD, with carbon pickup, almost completely eroded after 72 hours in pickle tank.

some cases, these materials did not crack or show intercrystalline attack but did develop a heavy continuous carbide network after the 1200°F heat treatment.

These stainless steels are not fully stabilized unless properly heat treated. If these alloys are annealed in the range of 1600° to 1800°F, there will be little trouble from sensitization. However, if higher temperatures are used, the titanium and columbium become partially dissolved. Then, when temperatures around 1200°F are used, chromium carbides form preferentially at the grain boundaries.

The higher the annealing temperature, the

more susceptible the material is to this condition. If annealing is done at 2050° or above, tests show that 18:1 instead 6:1 titanium-carbon ratio would be necessary to assure stabilization in some type 321 heats. High annealing temperature should be followed by heat treatment at 1600° to 1800°F to precipitate the titanium or columbium carbides, after which exposure to 1200°F will not result in sensitization.

Another allied trouble is where only the surface has a sensitized structure. This may come from carbon pickup due to furnace atmosphere, grease left on parts before heat treatment, carbon pencil marks, or in shell castings from the

resin binder. Carbon content in a localized area may be so high that there is not enough titanium or columbium to stabilize it.

This condition can be overcome by annealing at a high temperature to diffuse the carbon into the metal. This is followed by a low-temperature stabilizing heat treatment, provided the final titanium-carbon or columbium-carbon ratio remains above the minimum.

As in other austenitic grades, cracking due to zinc contamination can occur in type 321 and 347. This may occur when the alloy has been in contact with metallic zinc.

In one case, zinc from identification tags rubbed off on type 321 bar stock. After the bars were annealed, they cracked whenever bending was attempted. Metallic zinc should not contact these types of steels, particularly if the material is to be subjected to stress or heat treatment. Use of zinc or galvanized steel tags for identification purposes, or galvanized tote boxes should be avoided.

Zinc contamination can also result from Kirk-site dies often used for forming. The presence of some alloying elements, such as copper, in the zinc seems to accentuate the bad effects of zinc itself. Zinc in marking pencils, crayons or ink may also cause trouble. If the presence of zinc is even suspected, the parts should be dipped briefly into dilute nitric acid before heat treating.

A test was made to determine whether zinc salts which might be deposited by possible galvanic action during shipment or weathering would cause cracking. Bar stock of 321 material was coated with zinc sulfate, zinc oxide and zinc chloride, respectively, then heat treated. The specimens were then bent, and no cracking occurred. It was evident that metallic zinc was the offender.

Another difficulty encountered was edge cracking after expansion of type 321 flash-welded rings. This was traced to improper grinding. After flash welding, excess metal was removed by grinding parallel to the weld seam. The direction of grinding was perpendicular to the direction of loading during expansion, causing a notch effect. This, plus the presence of work hardened metal due to grinding caused cracking during the sizing operation. Grinding the last pass parallel to the loading direction minimizes this type of edge cracking.

Compared with 347, type 321 contains more stringers and noticeable amounts of titanium carbonitrides, both of which are very hard and can affect machinability and appearance. When nonmetallics become concentrated, stringers result which tear open or smear during machining.

This condition often leads to erroneous first impressions of type 321 stainless. In machining certain parts of this alloy, tool life was very short. It was suspected that the material contained more than the usual amount of stringers and titanium carbonitrides.

Study of microstructures showed the alloy to

be of normal quality. Chemical analysis was within limit. Other checks showed a 20 RB increase in hardness after machining, which is not abnormal. Finally, the oil-water ratio of the coolant was checked and found to be 1:8. When water was added to increase this ratio to 1:15, tool life increased about eight times. Thus, the metal was not at fault.

Failures of type 347 stainless steel cooling coils for catalytic cracking units in the oil industry are not uncommon, particularly when the equipment operates intermittently at temperatures as high as 900° to 1100°F. Such failures are prevalent where austenitic stainless steel is welded to carbon steel. Such failures are ascribed to stress corrosion cracking.

The coefficient of expansion of type 347 is about 1.4 times that of low-carbon steel. Expansion and contraction of the tubes due to temperature variations set up stresses when movement of the 347 tube is restricted by the coils or by the carbon steel to which it is joined. Salts such as $MgCl_2$, $ZnCl_2$, $CaCl_2$ and NH_4Cl will accelerate this attack if present even in small amounts.

Use care in welding

Careless welding can be another source of trouble. For example, oxyacetylene welded manifolds were failing in service by severe cracking. Microstructure of the parent metal was normal. However, massive networks of chromium carbides were visible in the weld. Analysis of the weld showed well over 1 pct carbon which was far in excess of specification limits, and far more than the columbium present could stabilize.

An actual part was subjected to a 72-hour pickle in a commercial pickling solution containing nitric, sulfuric and hydrofluoric acids. The parent metal was unattacked, but the oxyacetylene welds were completely eroded. Inert gas-shielded tungsten arc welds on the same part were unaffected. The type of filler rod made little difference. When flame conditions were corrected to avoid carbon pickup, the trouble was overcome.

Several failures were encountered in expanding flash-welded 321 and 347 bar stock. The material was in the solution heat-treated state when delivered to the welding area. No hardening would be expected from welding such steels, yet there were hard areas where the fractures had occurred near the weld joint.

Investigation showed that heavy clamping pressure and the upsetting operation during welding could cause work hardening. When the rings were annealed before expanding, the breakage no longer occurred. Also, when the welds were properly annealed after welding they could be held for 96 hours at 1500°, 1600°, 1700°F and subjected to the Strauss test, then bent 180° over a diameter equal to the bar thickness.

Silicon in the range of 0.50 to 1.00 pct improved shielded arc welding properties of both 321 and 347. However, 347 appeared more sensitive to this than 321.

Designed for simplicity—

Modernized Facilities

PLATE GRAVURE CYLINDERS

Better and Faster

♦ Better leveled surfaces, faster production, and simpler operation are the chief benefits derived from a modernized setup for plating gravure cylinders . . . Storage, handling and processing were further simplified by standardizing on only two cylinder sizes . . . Use of a copper fluoborate bath, instead of a sulphate solution, not only gives fine-grained, ductile deposits, but cuts plating time.

By J. H. Molitor, Vice President,
Art Color Printing Co., Dunellen, N. J.

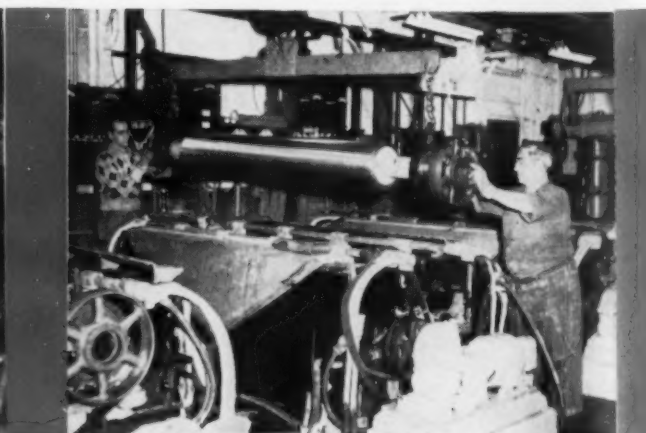
♦ THREE THINGS were sorely needed in the gravure plating field: faster plating baths, smoother copper finishes, and better methods for handling the big cylinders. Art Color Printing Co., Dunellen, N. J. has not only tackled these problems but is now plating 12 to 14 cylinders daily, and can turn out 20 if necessary. By modernizing its plating room, it is getting better leveled surfaces, faster production and simplified operation.

Gravure cylinders resemble large steel rolling pins covered with a thick outer layer of copper. A thin coating of copper is plated on top of the heavy copper layer in preparing a cylinder for a plating run. This surface, which is used as the printing surface, is etched.

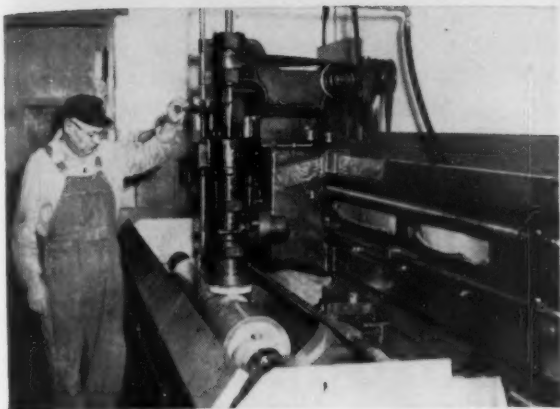
If the press run is long, the cylinder is given



PREPARATION of gravure cylinder for plating includes removal of rough spots and coating surface with silver nitrate solution.



CYLINDER is placed in acid copper bath where it remains for about 2 hours. Current at 250 amp per sq ft deposits 0.007-in. coating.



AFTER CHROME PLATING, cylinders are polished to a high luster. The chrome layer is about 0.00025 in., and is applied for long runs.



COATING peels off rather easily even though it hugs the cylinder tightly. After a press run, a cylinder is peeled and taken to storage.

a hard chrome coating. When a run is completed, the cylinder is removed from the press and returned to storage. Before reusing it, the plated surface is stripped and a new coating applied.

In streamlining its plating operation, Art Color has standardized its cylinder sizes, minimized cylinder handling, achieved rigid control over plating baths and developed better plating baths. This was done in cooperation with Hanson-Van Winkle-Munning Co., Matawan, N. J., which supplied equipment and designed special plating tanks for this installation.

Cylinders standardized

Only 35 and 45-in. diam cylinders are now used. Both have a 76-in. length. By standardizing on two cylinder sizes, storage, handling and production procedures have been simplified. With a standard length, no cylinder adapters are necessary, and no adjustment is ever required on processing equipment to hold the cylinder.

Plating is also simplified. With only two types of cylinders, only two sets of plating conditions are needed. With each cylinder being the same length, handling methods are similarly standardized.

Handling has been improved by simplifying work procedures. Cylinders are processed in assembly-line fashion. Storage racks are located next to the plating line. When a cylinder is to be plated, the operator selects one from the storage area only a few feet away, strips the old coating, and moves the cylinder over to the plating line.

Preparation tanks, copper plating tanks and chromium plating tanks are situated in-line, making handling an easy task. The plating line is serviced by overhead hoists. During processing, two operators simply lift the cylinder from one tank, move it along the rail, and lower it into the next tank for further processing.

Plating tanks have down-draft exhausts, doing away with overhead obstructions which would make conveying of the cylinder difficult.

Work simplification methods have been applied to all handling as well as processing operations. The plating room, for example, has been located near the polishing machines. The polishing machines in turn are near the etching room, and this room is adjacent to the printing presses.

Automatic temperature controls have been installed at all plating baths. When a bath strays from its prescribed temperature, steam or cold water is automatically fed to the bath until it is properly adjusted. Air-operated valves control the temperature of the copper baths, and electric valves control the temperature of the chromium bath.

To improve finishes and speed plating, two new processes are being tried. The first is a periodic-reverse plating process which is expected to improve surface smoothness. Tests have been run with one copper bath using a copper sulphate solution, without special auxiliary equipment for additives.

Faster solutions tested

To speed up copper plating, a copper fluoborate solution is also being tested. This bath puts the required copper coating on a cylinder in 1 hour—a time reduction of almost 50 pct. Components of the bath are copper fluoborate and a fluoboric acid. The bath produces fine-grained deposits which are ductile and easily polished to a high luster.

The fluoborate solution costs about five or six times as much as a sulphate solution, but its anode and cathode efficiency is almost 100 pct. In the long run, overall chemical costs are about the same. However, equipment costs are higher since the fluoborate bath requires a filter, heat exchanger, circulator wires and diaphragms for the anodes for efficient operation.

Casting Quality, Ease of Mechanization Key Shell Mold Advantages

- ◆ Successful production of shell molded parts centers around handling of the sand-resin mix and the mold pattern . . . Ingredients must be carefully weighed and blended to obtain a shell with good strength, surface finish, and permeability.
- ◆ Good patterns are vital to production of both shells and castings . . . Cast iron and alloy steels have proved to be excellent pattern materials . . . Industry need is for a cheaper, faster method of patternmaking to take full advantage of the shell molding process.

By W. F. BYE, Senior Product Estimator
Spicer Mfg. Div. of Dana Corp., Toledo

Part II

◆ SHELL MOLDING has brought new ways of working to the foundry. These have affected every phase of operation, often demanding an entirely new approach to the solution of foundry problems. The success of these new techniques has made available to all industry an improved foundry product.

Best results are obtained with a washed sand having a clay content of 1 pct or less. Grain fineness of sand should range between 100 and 150 AFS. Above 160 AFS, mold strength begins to decrease and much higher percentages of resin are required. Below 90 AFS, casting surfaces become coarser.

Sand should be dry. Moisture produces uneven curving. A round grained sand produces a denser, yet more permeable shell. Since resin is one of the greater items of expense, cheap sands which require more resin produce no saving.

The binders used are phenolformaldehyde resins. These are thermosetting and, once in their finished shape or cured condition, cannot be re-softened or remolded.

Two types of phenolic resins are available—one stage and two stage compounds. The two stage materials, which use the additive hexa-

methylene tetramine to complete the chemical action, may be stored longer and show little tendency to lump.

A 5 pct resin mix produces a good surface finish and maximum mold strength. As resin content falls, shells become weak, tend to crumble



PARTING COMPOUND prevents the sand-resin mix from sticking to the hot pattern. Here, in General Electric Co.'s shell mold laboratory, a silicone emulsion is sprayed on pattern.

and casting finishes approach those of green sand. Little increase in mold strength occurs above this percentage. When the resin ratio passes 8 pct, scale and sand penetration occur on the casting surface and it shows excess blow holes.

Mixes should not be prepared too far ahead of usage due to the possibility of moisture absorption.

Burnout tests should be made to determine correct mixing time. Three of four sample batches are taken from the mix and weighed. The samples are then heated above 600°F and reweighed. Above 550°F resin will burn out leaving sand only. The ratio of the weight after burning to the weight before is the percentage of sand in the mix. If this ratio is constant for all batches, it can be assumed the mix is uniform.

Forming and curing are final steps in shell production. The shell is produced in its soft state when the mix is applied to a heated pattern.

A saturation curve relationship exists between rate of build up and shell thickness for any pattern temperature. As a shell builds up it offers increasing resistance to formation. Eventually resistance becomes large enough to prevent further increase in thickness. This point of resistance, a function of shell thickness, increases with temperature. For example, Table I, a pattern temperature of 250°F will produce a 1/16 in. shell while a pattern temperature of 550°F will produce a shell over 3/4 in.

Economy requires the time cycle to be as short as possible. Pattern temperature should be kept as close to 550°F without exceeding it, and shells should be kept as thin as possible.

Minimum shell thickness is governed by one of two things. When a mold is poured, it must maintain its form long enough for the metal to solidify. If the mold is too thin the metal will

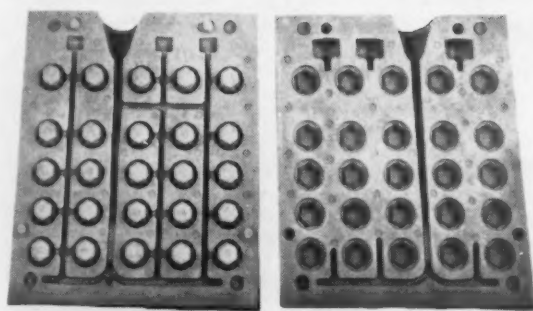
burn out, causing break-through and producing poor finish castings. Hence shell thickness must be increased as the casting becomes larger. The other limiting feature is handling. When wall thickness becomes less than 0.100 in., the increased handling time to prevent breakage will usually more than offset the additional forming time.

Mold finish is almost entirely dependent upon the pattern smoothness, uniform pattern temperature, and the mix used. Good casting quality depends on good mold finish and use of a mix that allows sufficient permeability.

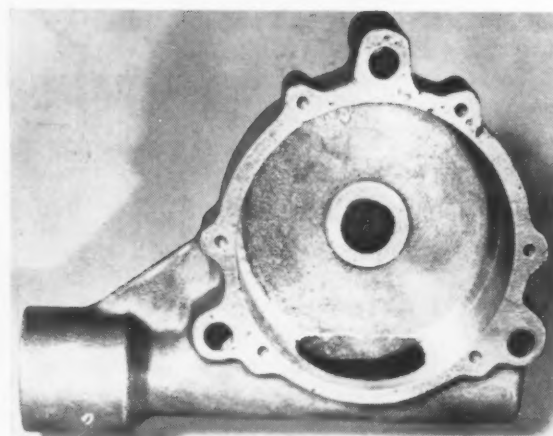
The shell is completed when the soft mix still on the pattern is cured in an oven. Curing converts the shell from a soft flowable condition to



WORM GEAR used in ice crusher fits in gear case shown below. Gear, which measures 4 x 3/4 in., was cast from G-metal. The unit is produced by the Brockman Tool & Mfg. Co., Bala-Cynwyd, Pa.



RISERS AND GATES are generally smaller for shell molds than for green sand castings. Gating is more difficult. This pattern is used in production by Walworth Co., Boston.



GEAR CASE for automatic ice crusher, cast in aluminum to close tolerances by Brockman Tool & Mfg. Co., has irregular parting line. Photos on this page courtesy Bakelite Co.

Shell strength depends on cure time, oven temperature and shell thickness . . . Maximum economy will be attained by curing at a temperature slightly below that at which warpage occurs . . .

one that is hard, rigid and has adequate strength.

Shell strength depends on cure time, oven temperature and shell thickness. The relationship between cure time and strength for a typical shell of $\frac{1}{4}$ in. thickness and an oven temperature of 600°F is shown in Table II. Maximum strength is obtained in 2 minutes and remains constant until cure time has reached 6 minutes. Strength then begins to fall off and after 10 minutes is reduced to the same strength as had occurred at $1\frac{1}{2}$ minutes cure time. Cure time should be held at 85 pct strength for maximum economy.

Effects of oven temperature and shell thickness with regard to cure time are shown in Tables III and IV. For minimum cure time, oven temperature should be as high as possible. However, when the temperature gradient between the oven and pattern become, too great, the shell warps.

Maximum economy will be attained by curing at a temperature slightly below that at which warpage occurs. For example, if pattern temperature is 400°F, start with the curing temperature at 700°F and keep increasing it in steps of 50°F. If warpage occurs at 950°F then the best oven temperature would be 875°-900°F.

Well designed, high finish patterns are essential. Shell and casting can have only as good a finish as the pattern itself. Pattern making skill for shell molding approaches that of tool-making and die sinking. With the subjection of patterns to temperatures to 550°F, a new concept of pattern design has been required.

A pattern material must be able to withstand temperatures to 550°F; be easily heat treated and machineable; be wear resistant; produce and maintain a high finish; have a low coefficient of expansion; be warp resistant; not cause sticking when the shell is stripped.

Cast iron has best met these requirements

through some success has been had with aluminum, brass, bronze, and alloy steels.

Aluminum is suitable for short runs and testing, but has disadvantages in high production. Aluminum will produce the cheapest pattern usable for shell molding due to its excellent machineability. In long runs, however, aluminum may cause sticking, and shows fast surface wear.

Baseplates should be standard

Low shrink alloy steels have been found extremely successful for small parts, but pattern cost is high. Brass and bronze, like aluminum, tend to break down on long runs.

Certain basic problems are encountered in designing pattern equipment for production. The baseplate should be standard in size and of the same material upon which it is mounted. Standard size is necessary to fit dump boxes or automatic machinery. The use of similar material for both pattern and baseplate prevents expansion problems. Baseplates and patterns should be from $1\frac{1}{2}$ to 2 in. thick to eliminate warpage.

Bolts and screws between pattern and baseplate should be fastened carefully. Repeated heating tends to loosen these screws resulting in bad shells. Threads should be coated with a lubricant to permit loosening of bolts and screws for pattern maintenance.

While draft angles in sand castings range from 3 to 7 pct, normal shell mold practice is to use from $\frac{1}{2}^\circ$ to 1° for most patterns. It is possible to produce a draw of 8 in. without draft. Four inch draws are not unusual and those of 2 in. are common. It is essential to hold draft angles to a minimum to reduce machining. It is usually as easy to machine off $\frac{3}{16}$ in. as $\frac{1}{32}$ in. Consequently, if draft exists on a surface that has

TABLE I
RATE OF SHELL BUILDUP

Shell Thickness, in in.	Time to Form Shell, in sec, at Varying Pattern Temperatures						
	250°F	300°F	350°F	400°F	450°F	500°F	550°F
1/16	24	12	8	7	5	4	4
1/18	—*	16	10	8	6	5	5
3/16	—	21	12	10	7	6	6
1/4	—	—	28	21	14	12	10
3/8	—	—	45	31	22	17	14
1/2	—	—	—	42	30	24	19
3/4	—	—	—	—	—	—	46
1	—	—	—	—	—	—	—

* Dashes indicate shell will not build up to this thickness.

TABLE II
CURE TIME vs. SHELL STRENGTH*

Time of Cure, min.	Maximum Strength, pct
0.5	40
1.0	65
1.5	85
2.0	100
3.0	100
4.0	100
6.0	100
8.0	95
10.0	85

* Shell Thickness, $\frac{1}{4}$ in.; Oven Temperature, 600°F.

to be flat, the advantages of a precision casting are lost.

Patterns should be fitted with enough ejector or knock-out pins to efficiently release the shell. They should be not closer than $\frac{1}{8}$ in. from the impression. Pins should have a rivet type head and be held together by a plate to insure uniform movement.

Mismatch between cope and drag decreases quality and the advantages of precision casting are lost. Casting flash can be virtually eliminated by correct locating-pin design and by strip riveting the baseplate.

Shrinkage varies with material

Shrinkage varies with pattern material, temperature, casting material, and position of pouring. The usual method of arriving at a correctly dimensioned casting is to use green sand shrink tables and check dimensions obtained on the resultant casting. Then by electroplating and machining, correct pattern dimensions can be obtained.

Uniformly heated patterns are difficult to obtain due to the nature of section changes in a casting. Rapid section changes can be lessened by contouring parts of the pattern, but this does not eliminate the problem.

By careful selection and arrangement of elements and correct application of external heat, it is possible to obtain uniform pattern temperatures automatically. The usual heating methods used include radiant heating from arches of electrical elements, heating by conduction and convection in ovens, and use of electrical elements within the pattern.

Pattern costs compared

Patterns cost at least twice as much as for green sand castings and often more. Pattern cost is presently limiting the application of shell molding to jobs of a high volume nature. It will be necessary to develop new methods of pattern-making that are faster, cheaper, and more standardized before the full advantages of the process can be obtained. A casting can be poured with the metal entering the cavity, vertically or hori-

How to Reduce Turbulence in Vertically Poured Patterns

- ◆ Decrease area of gating section to one-half or less of conventional green sand methods.
- ◆ Taper down sprue at about 3 to 1 to a level about $\frac{1}{2}$ in. below cavity ingate.
- ◆ Provide a well at bottom of down sprue to dissipate turbulence.
- ◆ Well should feed through a strainer into a choked section which increases in section horizontally. Strainer removes slag or dirt and refines metal.
- ◆ Feed choked section into another smaller well which acts as a pressure equalizer and additional dirt catcher.
- ◆ Feed pressure equalizer into the runner with initial section increasing until reaching regular runner size.
- ◆ Use flowby section at ingate, extending the runner beyond the point where metal enters the cavity.
- ◆ Cavity ingate or opening should be as large or slightly larger than for green sand castings to make metal enter cavity at a relatively slow rate.

zontally. Most metals pour better vertically than horizontally, due to shrinkage characteristics as solidification takes place, and yield castings of improved internal soundness and surface finish. Some metals such as malleable iron produce better castings when poured with the parting line horizontal.

When metal is poured vertically, bottom gating and restricted metal flow are essential. Shell surfaces offer less resistance to metal than green sand. When direct gating is used and metal is poured into the top of the cavity, turbulence causes porosity and poor finish.

Gating must be designed so the metal can flow uniformly and smoothly into the cavity. This requires use of bottom or indirect gating to "choke" the flow allowing metal to flow up into the cavity, and preventing downward turbulence. Since metal is going to drop somewhere in the gating system, metal velocity will have to be restricted by "choking" before entering the cavity.

TABLE III
CURE TIME vs. OVEN TEMPERATURE*

Oven Temperature, deg F.	Time of Cure, min.
350	3.0
450	2.0
600	1.5
800	1.0
1000	0.8

* A typical shell, $\frac{1}{4}$ in. thick, with maximum strength of 85 pct.

TABLE IV
CURE TIME vs. SHELL THICKNESS*

Shell Thickness, in.	Time of Cure, min.
$\frac{1}{8}$	0.8
$\frac{3}{16}$	1.0
$\frac{1}{4}$	1.5
$\frac{3}{8}$	2.5
$\frac{1}{2}$	4.0

* Typical Shell: Maximum Strength, 85 pct; Oven Temperature, 600°F.

It's in the mixing—

Powder Metallurgy

PERMITS GOOD CONTROL

Over Combined Properties

◆ Electrical contacts must have an outstanding combination of properties . . . Mechanical mixing of powdered metals makes it possible to acquire these combinations not obtainable by other means.

◆ Ductile powdered metal materials can be rolled, headed, punched and bent . . . Refractory materials will not stand such treatments, but can be machined by turning, boring and grinding.

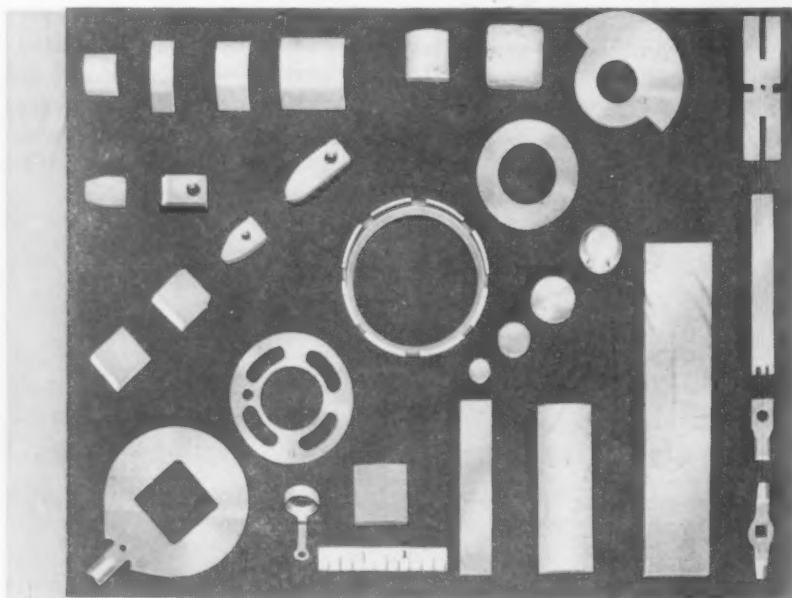
◆ Most contacts are silver soldered to their supports . . . Small contacts are sometimes attached by a technique combining welding and brazing.

By F. R. Farnham, Chief Engineer,
Gibson Electric Co., Pittsburgh

◆ ELECTRICAL CONTACTS have an all important job in a circuit. They make and break a circuit, and carry and transfer current. Their duties are such that they must have an unusual and outstanding combination of electrical and mechanical properties. Ideal contacts should have high electrical and thermal conductivity, high melting point, high hardness, resistance to corrosion, and resistance to mechanical, electrical and thermal shock.

Many elements are used as contact materials. The most common are silver, copper, cadmium, palladium, platinum, gold, nickel, tungsten, and carbon or graphite. However, any one of these elements has certain deficiencies. Ways have therefore been investigated to obtain more suitable materials.

Alloying of elements has helped in some cases. In other cases, it has failed badly. This has



DUCTILE powdered metal materials can be rolled, headed, punched and bent. These contacts were punched and formed from strip.

probably occurred because two or more elements, when alloyed, lose their individual characteristics and form a product which may be quite different in properties. Also, some of the desirable elements are not mutually soluble and therefore will not alloy together.

Powdered metal products, being mechanical mixtures of finely-divided particles, make it possible to produce combinations not obtainable by other means. Since individual characteristics of the constituents are not destroyed, finished products display properties which are a composite of those exhibited by each component.

Lubricants minimize wear

Electrical contact materials made by powder metallurgy techniques may be classified broadly in either of two categories: (1) ductile or semirefractory and (2) individually-molded or refractory types. Silver or copper is usually a constituent because of its excellent thermal and electrical conductivity.

The terms ductile and individually-molded are derived from an observation of the workability, or lack of it, in the finished materials. The ductile materials can be rolled, headed, punched and bent. Individually-molded materials will not withstand such treatment, but they can be machined by turning, boring and grinding.

The powders used are commercially pure and very fine. With few exceptions, 100 pct of the



REFRACTORY contacts are molded to near final size and shape. They will not stand treatments of ductile contacts, but can be machined.

powder will pass through a 325-mesh screen. In some tungsten powders, for example, average particle size may be as small as one micron (0.001 mm). Some semirefractory powders, though initially fine, are deliberately agglomerated. This may be to improve flowability, or a means of imparting special characteristics to the end product.

The ductile materials are characterized by the addition of semirefractory powders, such as nickel and cadmium or other metal oxides, to silver or copper powder. This grouping sometimes includes materials containing relatively small amounts (20 pct or less by weight) of refractory materials as tungsten and graphite.

Although these combinations can be molded individually to final shape, they are produced most economically by fabricating large billets which are then rolled into suitable slabs or strips from which the contacts can be punched. The first step in producing the ductile type materials is to mix the individual powders together in the desired proportions.

Mixing is usually done by a tumbling or ball-milling operation to thoroughly blend the powders. Addition of a lubricant during the mixing operation sometimes helps powder flowing characteristics which are important if the material is to be used in a hopper-fed tablet type press. Lubricants also minimize or prevent wear and galling of tools and molds.

After mixing, the materials are inserted in a mold or cavity of appropriate size and compacted



TABLET PRESS molds small electrical contacts. Either a single or multiple-cavity press may be used. Hydraulic presses form large parts.

at pressures of about 10 to 25 tons psi. The compact is then removed from the mold and sintered in a reducing atmosphere, usually at 1400° to 1600°F. The material can then be rolled into sheets, slabs or strips. Depending on the amount of reduction, intermittent annealing operations may or may not be required.

Materials containing oxides are sintered in a neutral or oxidizing atmosphere. Otherwise, they are handled in much the same manner.

If a ductile material is being molded to final size and shape, it is usually put back in the mold and restruck or coined subsequent to the sintering operation. The coining pressure may be about 30 to 50 tons psi. The contact may or may not be resintered.

Although rolling or coining operations are essentially production or sizing techniques, they provide a very important material characteristic. This has to do with the grain structure which is made somewhat plate-like or laminar. Such a structure resists deformation of the contact, provides evenly distributed wear, and tends to prevent sticking or welding of the contacts, particularly in the case of silver-graphite compositions.

Contacts which are individually molded are those containing appreciable amounts of refractory materials as tungsten, molybdenum, and their carbides. Here again, silver or copper is

included for its excellent thermal and electrical conductivity properties.

The term "individually molded" implies that the as-pressed contact is as close as possible to final shape and size. This assumes that proper allowance for subsequent shrinkage is made in the as-pressed size.

There are two general methods by which individually-molded or refractory contacts are produced. One method, often called the press-repress method, is very similar to that used for the individually-molded ductile types. The production steps are practically the same except for the sintering conditions.

Sintering bonds particles

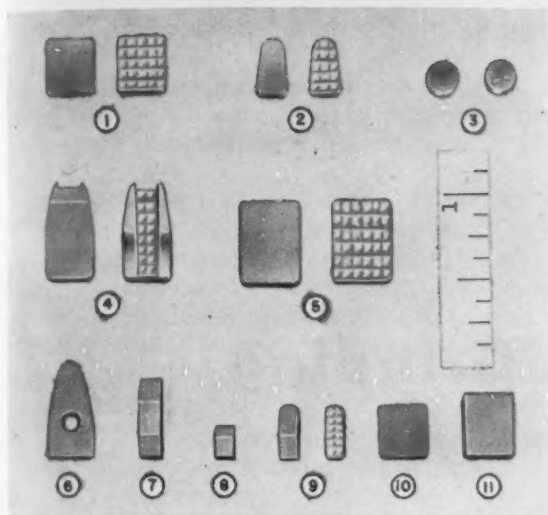
In sintering refractory materials, high temperatures can be used. The temperatures may be higher than the melting point of the lower melting point material. A silver, tungsten combination, for example, may be sintered at 2000°F although the melting point of the silver is 1760°F. This is known as sintering in the presence of a liquid phase.

The other method is the impregnation or infiltration method in which the as-pressed contact may be either 100 pct refractory, or a mixture of the refractory and a portion of the low

TYPICAL PROPERTIES

of Some Powdered Metal Contact Materials

Type of Material	Composition, pct	Electrical Conductivity, pct	Hardness, R 15-T Scale		Density, g per cc
			Annealed	4 B & S Nos. Hard	
Ductile	Silver	106	30	75	10.5
	85 Ag - 15 Ni	85	45	80	10.2
	60 Ag - 40 Ni	65	65	85	9.8
	90 Ag - 10W	94	45	80	11.0
	90 Ag - 10 CdO	80	40	80	9.8
	95 Ag - 5 C	60	20	65	8.5
Refractory			Rb		
	40 Ag - 60 Mo	48	80 - 90		10.0
	50 Ag - 50 W	62	60 - 70		13.1
	50 Ag - 50 W-C	50	75 - 85		12.3
	30 Cu - 70 W	35	85 - 95		13.9
	50 Cu - 50 W-C	45	90 - 100		11.1



SERRATIONS with excess silver serve as means for attachment. The silver alloys with copper to form silver solder when heated.

melting point metal. As an example of the latter case, one-half the total amount of silver required for a silver-tungsten contact may be included as silver powder in the pressed contact.

The appropriate powder is then compacted in a cavity to form a briquette which includes a predetermined amount of porosity. Porosity must be controlled so that it can absorb the correct amount of infiltrant to provide the desired final composition of a dense and homogeneous material.

The porous compact is then sintered, preferably in dry hydrogen, at a temperature around 2000°F for about one hour. Sintering results in some bonding of the refractory particles, thus increasing strength and hardness, and providing some densification.

A weight of infiltrant¹ which would fill the inter-connected pores of the sintered skeleton is placed on top of the skeleton which is then reinserted into a furnace at a temperature high enough to melt the infiltrant. By capillarity and gravity, the melted metal will seek out and fill the pores of the skeleton, resulting in a very dense, strong product.

The amount of infiltrant may be increased slightly over that required to fill the pores of the compact. This additional amount can be caused to flow over one surface of the contact so that it will have a pure silver or copper coating.

There are many possible variations of the general techniques. For example, an alloy, rather than silver or copper, may be used as the low melting point material. In addition, contacts which are to be impregnated can be immersed in a molten bath of the infiltrating metal.

Most powder metal contacts are silver soldered to their supports. A pure silver or copper layer on refractory contacts facilitates this operation since it is much easier to silver solder to this type of surface than to a refractory-rich surface.

The contact manufacturer can also preplace or flush a coating of silver solder on the contact. This eliminates handling, cutting and placing of solder by the user. It also insures a better joint since the contact surface is wetted by the solder in a reducing atmosphere.

Allowance for shrinkage

Attachment of small contacts is sometimes made by a technique which is a combination of welding and brazing. The contacts have serrated backs on which excess silver is placed. The serrations cause localized heating upon passage of welding current. The heat melts some of the excess silver which alloys with the copper of the support, thus forming a silver solder.

Powdered metal contact are molded, where possible, in automatic or semi-automatic tablet presses. These may be either single-cavity or multiple-cavity rotary presses. For large parts, hydraulic presses are used.

Because many of the powders are abrasive, tungsten carbide cavities and plungers are used to obtain good tool life. Where quantities are small, steel tools may be appropriate.

In designing tools or molds, allowance is made for shrinkage of the contacts during processing. Depending on the material involved, total shrinkage may typically be in the range of 0.25 to 5.0 pct. Consideration must also be given to the compression ratio. This will determine the required depth or thickness of the mold.

Avoid re-entrant angles

Furnaces may be either continuous or batch type, depending on the particular requirements. Heating elements are often made of molybdenum wire particularly in the batch-type muffle furnace. Reducing atmospheres, such as dry hydrogen, partially-combusted natural gas and air, or dissociated ammonia, are appropriate.

As is the case with any powdered metal product, certain things should be avoided. These include: re-entrant angles; extreme changes in cross-section; shapes requiring a meeting or touching of the top and bottom plungers in the cavity when pressing the contact; shapes which would require feather-edge plungers; and very thin cross-sections of small parts.

ACKNOWLEDGMENT

The author expresses appreciation to the management of Gibson Electric Co. for permission to publish this article.

REFERENCES: ¹ U. S. Patent No. 2,641,670 —June 9, 1953.

Work holding devices—

Modern Centerless Grinding SPEEDS OUTPUT OF PRECISION PARTS

By J. E. HYLER, Consultant
John E. Hyler & Associates, Peoria, Ill.

PART I

- ◆ Centerless grinding equipment and methods have kept pace with the metalworking industry's demands for volume production of precision parts . . . Better machines, better grinding wheels, better work-handling methods have been developed to meet processing needs . . . Jobs once bypassed as impractical are now considered commonplace.
- ◆ Most centerless units use abrasive wheels, but belt types are growing in importance . . . Special attachments and precision adjustments permit form and taper grinding in addition to straight cylindrical work.

◆ **DEVELOPMENT OF CENTERLESS** grinding machines something over 25 years ago was an outstanding departure from previous cylindrical grinding practice. Since that time the centerless process has enjoyed a steady growth throughout the metalworking industry.

Early centerless units all made use of grinding wheels. Such machines will probably continue to dominate the field, although centerless grinding and polishing units using abrasive belts are growing in importance.

The greatest advances in centerless grinding have occurred through the use of wheel-type machines in a full line of sizes, for which various auxiliary attachments have been developed. Some of these grinders, designed for close tolerance work on small parts at high production rates, may be equipped with a crush-forming attach-

ment if desired. When so equipped, they will do form grinding, profile work, etc.

Other centerless machines are made so that both wheels can be adjusted relative to the work. Therefore, no adjustment of the work in a horizontal direction is necessary.

Work being ground by the centerless method is supported on a work rest blade at predetermined height. The supported part is revolved by a regulating wheel and ground by the abrasive wheel.

Proper design of the work rest blade, its cor-

MR. HYLER, author of numerous technical articles, has an extensive knowledge of metalworking based on more than 20 years of practical shop experience. Parts II and III of this series will appear in the Dec. 2 and 9 issues.

rect adjustment, and the material of which it is made, are important factors. The blade must be able to support the work at proper height and correct alignment as long as possible before the blade must be redressed or reground to original accuracy. The upper edge of the blade which contacts the work must be perfectly straight if straight work is being ground. Otherwise, the supporting edge is designed to conform to the work profile.

Carbide lengthens blade life

It became evident that blades with tungsten carbide in their work-supporting edges would be advantageous, due to the carbide's extreme wear resistance. Life of such blades between grinds is from 10 to 30 times that of ordinary cast iron or steel blades.

In some cases, tungsten carbide wear strips are set in channels machined in the top edge of a steel blade. In other types the wear strip is simply brazed to the top of the steel support blade. Still other manufacturers of these blades produce a so-called segment type. This blade has its working edge interrupted by uniformly spaced slots, with short carbide segments brazed between these slots.

Advantage claimed for the segmented blade is that the short carbide pieces are not warped or strained during the brazing process. This blade type is said to be more strongly resistant to chipping or damage under pressure. And the slots between segments, it is claimed, allow the grinding coolant to flush away any chips, thus helping to keep blade temperature at a most efficient level.

Where a segmented blade must be reconditioned, one need only replace the damaged carbide pieces and not an entire strip. Some manufacturers of these blades repair and regrind worn

or damaged blades for only a fraction of the new blade price.

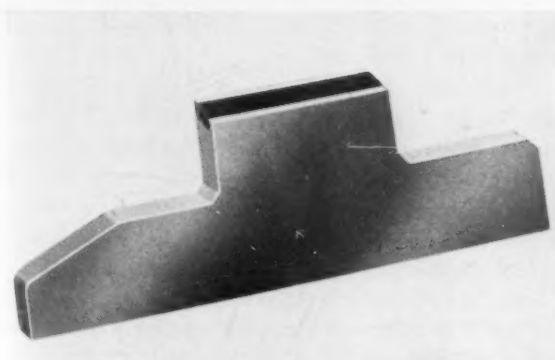
Height adjustment on a centerless grinder work rest blade is very important. A good rule is to support the work as high as possible. In straight centerless grinding (if oblique setting of the grinding wheel and regulating wheel be ignored) the grinding wheel and regulating wheel may be considered as having their axes in a common plane. It is a point in successful practice not to have the approximate center of the workpiece in a common plane with the regulating and grinding wheel centers.

With work and wheel centers in a common plane, any low spots on the work encountering the regulating wheel would automatically generate a high spot of almost equal magnitude on the opposing abrasive wheel. Since this action would repeat each time the work revolved, the correction rate for any existing departure from roundness would be very slow.

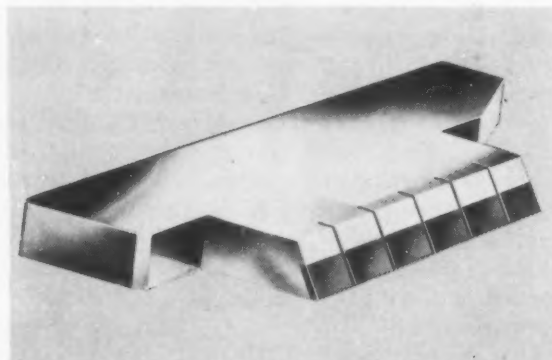
Better to hold work high

The same high-low action inevitably occurs in some degree even when the work has its approximate axis above the center line of the wheels. But it occurs in greatly reduced proportion because the regulating wheel's thrust on the work is not precisely toward the point of work contact on the grinding wheel. Thus a strongly corrective action takes place with each revolution of the work. The higher the work can be consistently held, the more pronounced is this corrective action and resulting grinding efficiency.

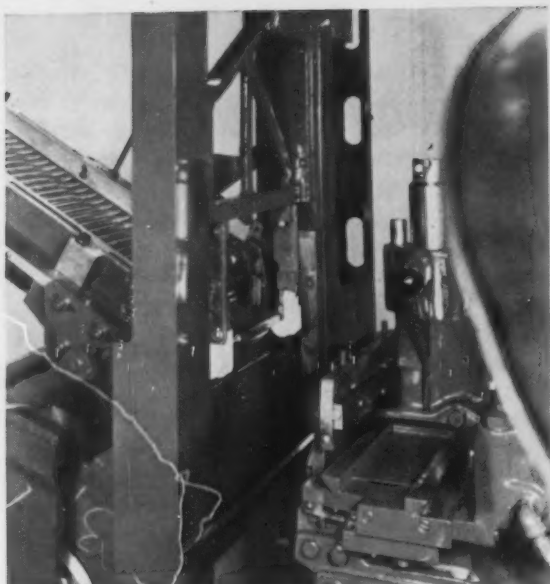
As often as it becomes evident that a work rest blade has lost its full degree of accuracy, it should be reground. Some cutter and tool grinding machines, with proper attachments, are particularly suited for this work. One such unit has a large, easy-to-read dial and a swiveling



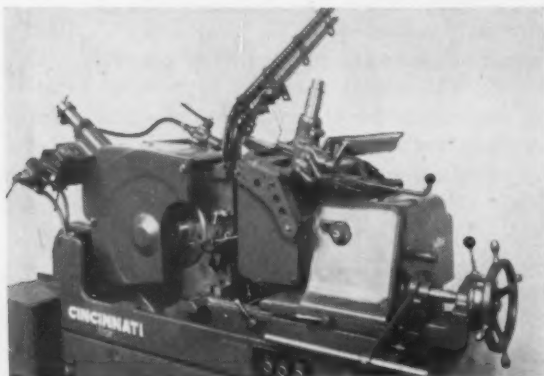
STANDARD infeed work support blade features cemented carbide insert for wear resistance.



SEGMENTED edge on this infeed work support blade aids the coolant-flushing action.



CENTERLESS setup for grinding armature shafts uses automatic infeed, loading and unloading.



LOADING hopper speeds 0.005 in. stock removal for a 10-12 microinch finish on valve stems.

range of 45° to permit grinding any desired bevel on the work support blade.

The work support blade, the regulating wheel, and the abrasive wheel should maintain actual and continuous contact with the workpiece during the grinding operation. Chatter marks are almost sure to develop if the workpiece loses contact with the grinding wheel.

Support blades are made to a thickness and length best suited for the work to be ground. Thin blades give proper clearance for small diameter work while thicker blades are required for adequate support of heavy work.

Through-feed blades have a perfectly straight top edge longitudinally, when cylindrical work is being ground on axial feed. This top edge is usually beveled with the high point next to the abrasive wheel. The work-piece should make line contact both with this beveled edge and with the abrasive wheel.

The regulating wheel does not have its axis horizontal when work is being ground by the through feed method. In some cases, it is swiveled as much as 7° from a horizontal axis

position. This oblique setting of the regulating wheel provides an end-feed action to the workpiece as it revolves on the blade and against the abrasive wheel. Increasing the oblique angle of the regulating wheel axis speeds the endwise travel of the workpiece.

When the regulating wheel's arbor axis is horizontal, the wheel will be cylindrical. It will generate cylindrical work and maintain full-face contact with the workpiece. But when a regulating wheel is swiveled to oblique-axis position, its face must be hollowed out in a manner to maintain full contact with the workpiece. The proper hollow shape is applied and maintained by swiveling the wheel-truing attachment to an angle equal to that of the regulating wheel arbor.

On most centerless grinders the abrasive wheel revolves in a fixed position. It has no adjustment toward or from the work rest blade or regulating wheel. But facilities are provided so that these three elements may be placed in correct relative positions for different diameters of work.

These adjustments are usually accomplished by a compound slide arrangement. A lower slide, mounted on the machine bed, moves the work rest blade and its support to or from the abrasive wheel. An upper slide carrying the regulating wheel and its housing is also mounted on the lower slide unit. Two slide locks are incorporated in the assembly. One fastens the lower slide to the machine bed at any desired position. The second lock rigidly clamps the upper slide to the lower one.

By this combination adjustment the correct relative positions of the abrasive wheel, the work support blade and the regulating wheel are easily set up. A separate height adjustment for the work support blade is also provided.

Experienced centerless grinder operators have little trouble producing good work. Substandard work might be caused by misaligned guides, machine vibration, unbalanced abrasive wheels, incorrectly-selected or adjusted work rest blades, or a workpiece center too near the plane of the wheel center.

Burrs or pieces of abrasive imbedded in or fused to a work support blade will score the work. And a bent or warped work support blade or improperly-dressed faces on the grinding or regulating wheel may also cause trouble.

Centerless grinders are now doing many jobs previously bypassed as being impractical. In many cases special automatic loading fixtures have greatly increased production.

One centerless setup grinds automotive valve stems at a rate of 18 per minute, removing 0.005 in. of stock and producing a 10 to 12 microinch finish. Another centerless operator tapers glass fishing rods. In one plant where 155 mm shells are centerless ground, production is at the rate of 80 shells per 50-minute hour. This setup uses a special roll conveyor type of through-feed loading mechanism.

CAN YOU TURN NON-PRODUCTIVE TIME INTO SAVINGS LIKE THESE?

On each of the examples shown here, most of the savings resulted from reducing the time between cuts. Almost all modern machines can make chips as fast as present day cutting tools can "take it," but only Automatically Controlled Cycle* gives you an opportunity to save where it counts most — by reducing non-productive time required to withdraw the tool, index the turret and advance the tool to the work. Acme-Gridley Fully Automatic Turret Lathes do this job at accelerated speeds — with minimum waste of time and manpower



TIME SAVED on Acme-Gridley Fully Automatic Chuck-Type Turret Lathe

Part Name
Material
Former Time
"MC" Time



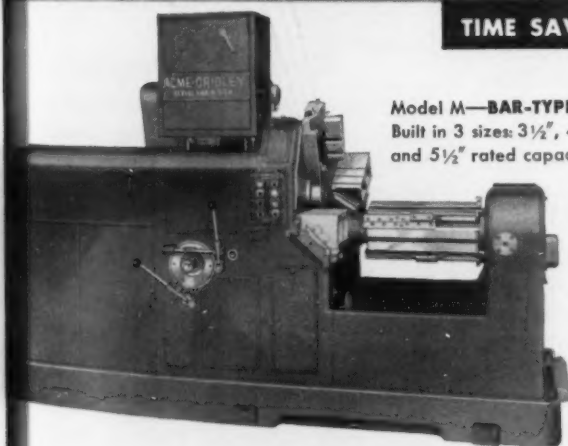
Finger Holder Body
6 5/8" dia. Semi-Steel
39.2 minutes
11.2 minutes

Savings 28 Min.



Master Collet Blank
6" dia. 4160 Steel (Solid Slug)
98 minutes
35.4 minutes

Savings 62.6 Min



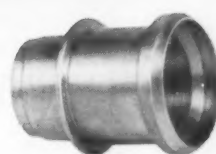
TIME SAVED on Acme-Gridley Fully Automatic Bar-Type Turret Lathe

Part Name
Material
Former Time
"M" Time



Sleeve—4x3 1/4" long
1112 Steel
30 minutes
6 minutes

Savings 24 Min.



Whirl—3 1/2 x 4 5/8" long
Leaded Open Hearth Steel
21 minutes
5.7 minutes

Savings 15.3 Min

Here's what AUTOMATICALLY CONTROLLED CYCLE* means to you

- The complete machining cycle is faster because all non-productive movements are performed automatically — and at accelerated speeds.
- Cuts are made (with either high-speed or carbide tooling) as fast as present day cutting tools can take it.
- Producing rate is thus predetermined and remains the same at the end of the shift as at the start.
- Machining is done at the surface speed best suited for required finish and tolerance because each toolslide is independently cammed and selective spindle speeds are automatically controlled.

*Standard on all Acme-Gridleys

The NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

ACME-GRIDLEY BAR
and CHUCKING AUTOMATI
1-4-6 and 8 Spindle • Hydra
Thread Rolling Machines • Au
matic Threading Dies and Tap
Limit, Motor Starter and Con
Station Switches • Solenoid
Contract Manufacturing.

NOW-Make Your Own Oxygen and Nitrogen in One Generator

...and Save
Up to 50%!



With INDEPENDENT'S newly-designed generators, you can make your own high-purity oxygen and nitrogen from the free air . . . and in the same generator.

You reduce costs up to 50% by eliminating handling costs . . . vaporizing costs . . . evaporation losses . . . residual losses . . . and transportation costs.

INDEPENDENT Generators are available in any capacity, any purity and any pressure. Put your oxygen-nitrogen problem up to us . . . our engineering department will gladly submit recommendations . . . no obligation, of course!

INDEPENDENT ENG. CO., Inc.



O'FALLON 4, ILLINOIS

FREE AIDS

New Technical Literature:

Plywood

Plywood shipping containers are covered in this case history booklet. The important manufacturing processes are covered. There is a section on the Safe Transit Laboratory facilities. Typical case histories show how shipping problems have been solved. Complete specifications are given. *Atlas Plywood Corp.*

For free copy circle No. 1 on postcard, p. 115.

Brazing

Low-temperature brazing is the topic of this new booklet. Discussed are the steam radiator valve, air vent valve, and the wave guide adapter. Easy-Flo and Sil-fos, two silver brazing alloys, are covered. Advantages include high strength joints, lower temperature, and time and heat economy. *Handy & Harmon.*

For free copy circle No. 2 on postcard, p. 115.

Relays

A new line of hermetically-sealed adjustable time delay relays is introduced in this catalog sheet. The sheet gives details on housings, settings, motors, operation, calibration, accuracy and reliability. Hermetic sealing is discussed. Diagrams and tables give further information. *A. W. Haydon Co.*

For free copy circle No. 3 on postcard, p. 115.

Textolite

Textolite industrial laminates are the topic of this new booklet. The material composition, mechanical properties, chemical properties, thermal and physical properties, and electrical properties are discussed. Tables give additional information. *Chemical Div., General Electric Co.*

For free copy circle No. 4 on postcard, p. 115.

Gratings

Expanded metal gratings are the topic of this new folder. Penmetal gratings are expanded metal made from heavy steel plate. Several gratings are shown and described. Their advantages are pointed out. A table

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 115.

gives sizes, dimensions and weights. *Penn Metal Co., Inc.*

For free copy circle No. 5 on postcard, p. 115.

Products

Oilgear's complete line of fluid power pumps, motors, transmissions, cylinders and valves is covered in this bulletin. It features a new electric-hydraulic servo control system for pumps and transmissions up to 150 hp, a new line of Oilgearducers for constant torque drives and variable delivery feed pumps. *Oilgear Co.*

For free copy circle No. 6 on postcard, p. 115.

Classified literature

This bulletin lists all current Honeywell Industrial Div. literature. Numbers and titles of all catalogs, bulletins, specification sheets and instrumentation data sheets are included. Honeywell services are listed also. *Minneapolis - Honeywell Regulator Co.*

For free copy circle No. 7 on postcard, p. 115.

Procurement plan

The Lewis - Shepard "6-Way Procurement Plan" is announced in this new brochure. This plan makes it possible to obtain industrial trucks of the L-S line on various terms. Terms include a broad lease program, a time payment plan, a short-term rental plan, outright purchase, a truck trial plan, and a trade-in program. *Lewis-Shepard Products, Inc.*

For free copy circle No. 8 on postcard, p. 115.

Catalogs & Bulletins

Gas analyzers

Mine Safety Appliances Co.'s complete line of combustible gas analyzers and alarms are described in this new brochure. The brochure gives details of how these instruments work, with descriptions of the components of the analyzers. Installations in varied industries are covered, and a method of designing a combustible gas alarm system is shown. Instruments to protect against most combustible gases are described. *Mine Safety Appliances Co.*

For free copy circle No. 9 on postcard, p. 115.

Valves

High pressure valves for hydraulic system and accumulator station control are the subject of this booklet. The valves are pictured and discussed. Design features are covered. Among valves covered are throttle and shut-off valves, filling valves, control valves, special valves and accumulator controls. Specifications are included. *Lombard Corp.*

For free copy circle No. 10 on postcard, p. 115.

Cam clutches

The complete Morse line of cam clutches is described in this new reference file. The cam clutches are for indexing, overrunning and backstop applications. The folder gives general information on Morse cam clutches, including cutaway views, operating functions, cam principle and design features. Specifications are given. *Morse Chain Co.*

For free copy circle No. 11 on postcard, p. 115.

Steel

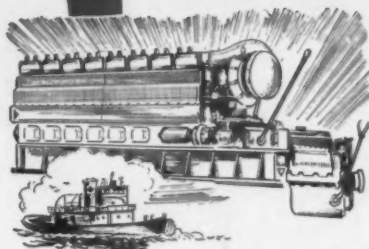
The opportunities for use of stainless steel in the building field are discussed in this new booklet. The advantages pointed out include beauty, economy and practicability. A section gives a technical briefing on composition and characteristics of standard stainless steels, and another discusses how corrosion-

Turn Page

For DEPENDABILITY



ERIE the correct fastener for the job!



Erie Fasteners are in wide use by the nation's leading Diesel Engine builders.

You can rely on over 40 years of experience in producing bolts, studs and nuts designed to withstand the effects of high and low temperatures, high stresses, fatigue and corrosion. Modern facilities enable our skilled craftsmen to produce to your specifications bolts, studs and nuts, precision machined and heat treated in carbon, alloy, stainless steel and non ferrous metals.

These Erie Products prove their quality every day in the railroad, chemical, petroleum and automotive industries; on farm, construction and industrial equipment and heavy machinery. Send your design and material specifications to us . . . we will make for you the Correct Fastener for the Job.

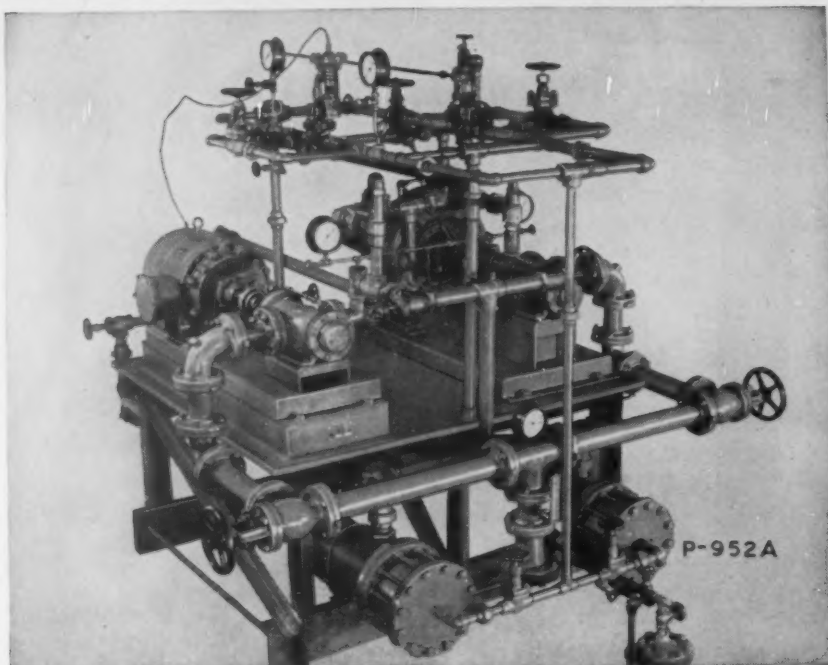


ERIE BOLT and NUT CO.
ERIE • PENNSYLVANIA
STUDS • BOLTS • NUTS
ALLOYS • STAINLESS
CARBON • BRONZE

Representatives in Principal Cities.

Complete Range of Sizes and Models
In Both Medium and High Pressure Types

MORE COMPACT THAN EVER..



P-952A—Steam Turbine and Electric Motor drive gives flexibility in this compact Model P-ES2H size No. 25 unit.

NATIONAL AIROIL FUEL OIL PUMPING AND HEATING UNITS

NATIONAL AIROIL Fuel Oil Pumping and Heating Units are specially designed to prepare, for combustion, all grades of fuel oil including No. 6 or Bunker "C" Oil and residuums. They will draw fuel oil from above ground or underground tanks, preheat it to proper constant temperature and deliver it to Oil Burners at an even pressure, best suited for the burners. Our Fuel Oil Pumping and Heating Units are the result of years of experience. They come completely equipped ready for steam, exhaust, condensate, oil suction, oil return, and electrical connections. All valves, regulators, etc., are readily accessible. The piping arrangement is easily understood. These compact, space-saving units are available in a range of sizes and models in both Medium and High Pressure types. For complete details, write for our Bulletin 40 — very interesting and informative.

OIL BURNERS and GAS BURNERS
for industrial power, process and
heating purposes

STEAM ATOMIZING OIL BURNERS
SLUDGE BURNERS, Steam Atomizing
MOTOR-DRIVEN ROTARY OIL
BURNERS

MECHANICAL PRESSURE
ATOMIZING OIL BURNERS
DUAL STAGE, Combining Steam and
Mechanical Atomization
LOW AIR PRESSURE OIL BURNERS

AUTOMATIC OIL BURNERS, for
small process furnaces and
heating plants

GAS BURNERS
COMBINATION GAS & OIL
BURNERS

FUEL OIL PUMPING and HEATING
UNITS

FURNACE RELIEF DOORS
AIR INTAKE DOORS
OBSERVATION PORTS
SPECIAL REFRACTORY SHAPES

NATIONAL AIROIL BURNER CO., INC.



1271 EAST SEDGLEY AVE., PHILADELPHIA 34, PA.

Southwestern Division: 2512 South Boulevard, Houston 6, Texas

FREE TECHNICAL LITERATURE

resistant is stainless and why. The booklet describes the structural and decorative possibilities of stainless steel tubing. *Crucible Steel Co. of America.*

For free copy circle No. 12 on postcard, p. 114.

Thread rolling

The Waterbury automatic inclined shell thread rolling machine is featured in this new bulletin. The machine is normally used connected to an eyelet machine. It automatically rolls the thread on hollow metal parts produced by the eyelet machine. Samples of some of the work which can be produced on the machine are shown. Specifications are given. *Waterbury Farrel Foundry & Machine Co.*

For your copy write on your company letterhead to address shown on reply card.

Crane control

All aspects of the P & H Magnetorque crane control are covered in this new booklet. A review of all types of crane controls is given. How the Magnetorque operates is discussed. The construction is shown. *Harnischfeger Corp.*

For free copy circle No. 13 on postcard, p. 115.

Carbide tipped tools

Carbide tipped tools are the subject of this new book. The use and care of these tools are discussed. The book gives brief data on recommended speeds and feeds for carbide tipped drills and reamers, with instructions for regrinding both types. Specifications are included. *Cleveland Twist Drill Co.*

For free copy circle No. 14 on postcard, p. 115.

Cleaning

Automatic cleaning and surfacing of automotive brake shoes for subsequent bonding of linings is the subject of this new bulletin. The bulletin gives case histories of companies showing how various manual surfacing methods were done away with. Among advantages listed are reduction in labor costs, elimination of bonding failures, improvement of working conditions and faster rate of cleaning. *American Wheelabrator & Equipment Corp.*

For free copy circle No. 15 on postcard, p. 114.

Turn Page

TERATURE

why. The
tural and
stainless
eel Co. of

card, p. 113.

rolling

inclined
ne is fea-
The ma-
nected to
omatically
ow metal
yelet ma-
the work
n the ma-
ations are
Foundry

pany letter-
ply card.

control

H Magne-
covered in
ew of all
is given.
operates is
uction is
rp.

card, p. 113.

ed tools

the sub-
ne use and
discussed.
on recom-
s for car-
reamers,
regrinding
s are in-
Drill Co.
card, p. 113.

Cleaning

surfacing
s for sub-
gs is the
etin. The
es of com-
us manual
done away
listed are
, elimina-
improve-
tions and
American
ent Corp.
card, p. 113.

IRON AGE

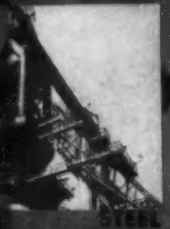
IronAge
FOUNDED 1855

**SPECIAL
STUDY**

salute to the WEST



ALUMINUM



STEEL



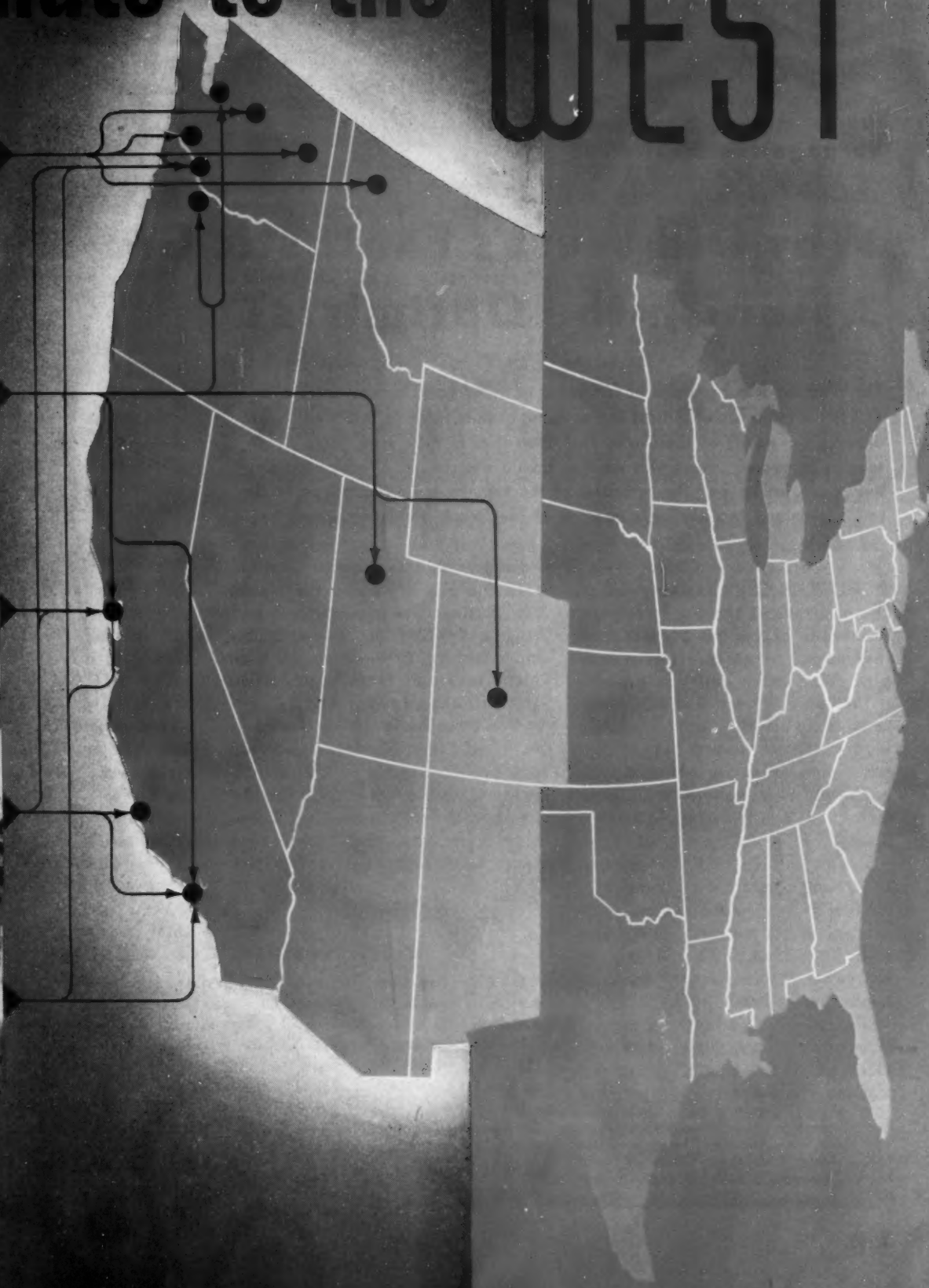
AUTOMOTIVE



SHIPBUILDING



AIRCRAFT



Surge in the West . . .

Why Did West's Fantastic Growth Astonish the Optimists?

The West holds out promise of fulfillment of many basic human needs . . . This is the main factor behind the amazing development of the West . . . It answers the needs of those who feel frustrated in their jobs, those seeking retirement, those who want to take a chance . . . Western industry has grown far beyond the estimates of the experts and will continue to do so . . . No end in sight for migration to the West—By Tom Campbell.

♦ WESTERNERS talking about the progress of the Far West and Mountain States no longer show indications of an inferiority complex. That extra effort to prove a point—akin to mental chest thumping—is no longer necessary. People from the 11 western states* now have more than ever before the basis for bragging but they talk in terms of solid accomplishments instead.

Easterners who not too long ago regarded westerners skeptically have had their comeuppance. Time after time the western phenomena baffled and confused the experts sitting in their eastern banking houses and offices.

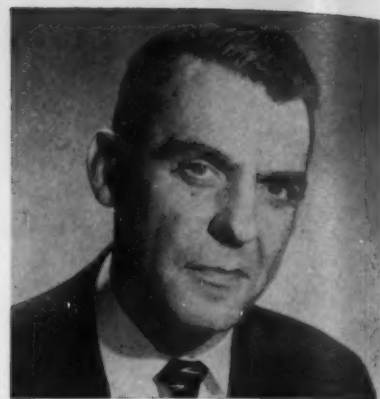
Statistics tell about the expansion of industry, farms and services, but this isn't the nub of the matter. People are still pouring

*The 11 western states covered in this special study are: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming.

into the Far West and the Mountain States. The population is getting a twofold boost—as it has since before 1940—from its high birth rate and from in-migration from other parts of the U. S.

You hear stories about the Ph.D. in Utah, who became a pouring platform supervisor in a steel mill in less than 18 months from the day he started work. In the East it had always been accepted that it took years to make even a first helper.

Then there is the story about



EDITOR Tom Campbell was one of the early believers in western growth. His conclusions are based on trips, interviews and continuous contact with people in the West.

the fellow in Colorado who had practically gone broke prospecting for uranium. Overnight he stumbled on a deposit which he eventually sold for \$9 million. There are tales about wildcatters who struck it rich in oil, others about men with new ideas and clear vision who have found success in the West.

But this still doesn't explain the rapid and continuous growth in the land of western enterprise. What makes people flock to the Far

How Western Steel Has Grown

Easterners can take little credit for the steel expansion in the West. In 1940 most eastern steelmen believed there was little or no foundation for new West Coast steel plants. But there were a few exceptions and these men were eventually proved right.

How fast has western steel developed? In 1936 THE IRON AGE Western Steel District (12 states) ranked 11th in the nation. It is now fifth. Capacity during that period shot up from 2 million tons per year to 8.9 million.

The Big Four in western steel are: U. S. Steel, Kaiser, Colorado Fuel & Iron and Bethlehem. Combined steel capacity of these firms is now 6,415,000 tons compared with a rating in 1945 of 4,495,000 tons (including capacity of government-owned Geneva Steel Co., later acquired by U. S. Steel). This is an increase of more than 42 pct. The future promises even greater expansion.

West and to the Mountain States? Who are they? How old are they? What happens to them? Answers to these questions give the real clue to what is happening out west.

Behind it all are human drives which will continue to keep all rates of growth for the western states on the upgrade for years.

Among these drives are:

¶ **Restlessness:** Thousands and thousands of people rebelled against conformity; others were bored. Hundreds of thousands of others seemed to have lost spirit or the zest for living. This restlessness brought many people to the Far West.

¶ **Ambition of the Unrewarded:** These people felt there was always a chance for them in a new place—and for many there was. The chance came faster and it seemed to satisfy an urge that went unrewarded elsewhere.

¶ **Wars:** Travel by people in the Armed Forces has had a lot to do with the growth of various sections of the country—and in particular the Far West and Mountain States. Many people in the services had their first chance to see the West. They liked it, stayed, or came back later.

¶ **Tourists:** The U. S. has become a nation of travelers. Geography by sight and sound has replaced textbooks for a lot of people. The urge to go from one part of the country to another has been responsible for much of the migration to the West.

¶ **Unhappiness:** There are always millions of people who are looking for the pot of gold. They believe that somewhere there is a chance to find happiness. This flight of fancy has led thousands and thousands of people to the West. Maybe they don't get what they went after, but they do seem to find something better than they had.

¶ **Retirement:** The pensioners and older people looking for more comfort and leisure have flocked to the Far West during the past 20 years. After getting there, many decide not to retire. They go into insurance, work for the government, enter real estate, or make a living teaching other people how to take it easy.

What do the 11 western states have to offer people with these drives? In part, this:

¶ **Wide Open Spaces:** There was and is now plenty of space in the West. It provides a cure to that "hemmed in" feeling which afflicts many people from the East. There is space for business, homes, and culture as well as play and hobbies.

¶ **High Wages and Salaries:** The West has consistently paid the highest wage and salary rates in the country.

¶ **Climate:** Americans are becoming increasingly anxious to find comfort and to avoid extremes in weather. Throughout the entire Far West and in the Mountain States the newcomer has his choice of climate and in very few places does he find extremes—unless he seeks them out himself.

¶ **Young Industries:** The West abounds with industries and enterprises which seem to have more of the gambling spirit and more informality than some of the more conservative and established endeavors in other parts of the country. This has been important in drawing the young—and the middle aged, too—to various western states.

What has this combination of human drives and basic attractions done to the West?

(1) It has kept people coming to the West and the Mountain States areas and it will keep them coming.

(2) It has expanded industry far beyond the estimates of the experts. And the experts will continue to be confounded.

(3) It has created new trends in fashion, cultural and leisure time activities.

(4) It has made the West a permanent part of the country's growth instead of an isolated 7-day wonder.

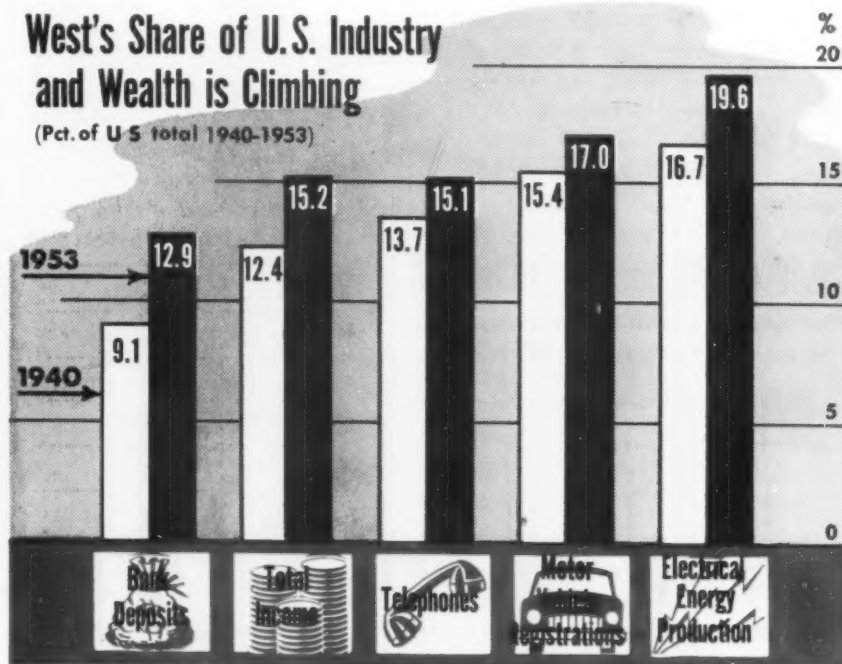
(5) It has brought about the use and expansion of the resources the West has always had.

(6) It has furnished for years a spiritual or a natural haven for those people who have a hemmed-in feeling, an "everything is done" attitude, or a "why can't it be me" desire.

The figures, the graphs and the interpretive statistics showing the West's spectacular development came after the people—not before. And the surge in this area is another indication Americans cannot be put under a microscope, maneuvered by slide rule or predicted as to their precise actions, likes, feelings, desires and dreams.

West's Share of U.S. Industry and Wealth is Climbing

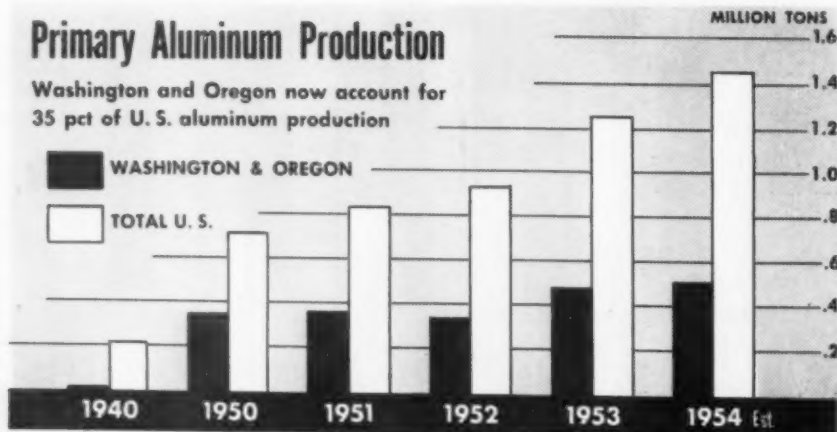
(Pct. of U. S. total 1940-1953)



Area in transition . . .

Pacific Northwest

In the last 15 years there has been a startling economic expansion in the Washington-Oregon-Idaho region . . . Factors behind the change are the development of huge quantities of low-priced electric power and the influx of metalworking plants into the area during World War II . . . Diversification is the key—By E. Marple.



♦ THE PACIFIC NORTHWEST, rich in resources and setting, is in transition. It is a region of growth and change, of constant striving to capitalize on a potential as yet largely undeveloped.

Lumber, agriculture, fishing and mining drew the first generations of settlers and largely underwrote the economy. These industries are still vital to the Northwest, but their relative importance is declining.

In the past 15 years, two factors have caused a marked broadening of the economy in the Washington-Oregon-Idaho region. One was development of large quantities of low-priced electric power which served as a natural lure for new industries—among them, important aluminum smelting operations.

Second vital influence on the economy of the Pacific Northwest was World War II, which caused a tremendous influx of metalworking industries to the area. Bombers from Boeing built the payroll at Seattle and nearby Renton plants to 45,000. Shipyards sprang into activity. Countless small metalworking plants expanded. And the huge Hanford atomic energy plant came into being.

When the war ended the region confounded the experts by expanding further and building a broader base for its growing population.

Key to the area's development has been diversification. This is apparent in all the Pacific Northwest's major industries:

Aluminum: Expansion in aluminum reduction plants since the war enables Washington and Oregon together to produce around 35 pct of the nation's primary aluminum.

Even more important from the point of payrolls has been the recent introduction of aluminum fabrication as represented by Alcoa's rod, bar, and wire mill at Vancouver; expansion of Kaiser's rolling mill outside Spokane, and the spawning of dozens of smaller aluminum fabrication plants that turn out a variety of finished products ranging from irrigation pipe to kitchen cabinets. And now Reynolds Metals Co. is considering setting up its first fabrication plant in the region.

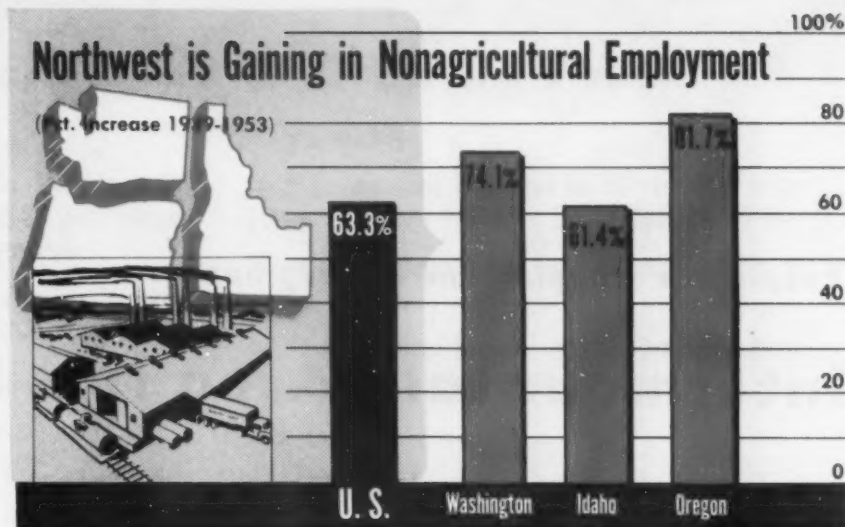
Chemicals: There has been tremendous growth in the chemical and electro-process industries in the last half-dozen years. New plants include those producing phosphorus in eastern Idaho; sulfuric acid made from waste gas at smelters in Tacoma, Wash., and Kellogg, Ida.; hydrogen peroxide and abrasives at Vancouver; vanillin at Seattle; ferroalloys at Portland, Tacoma, Spokane, and Wenatchee, Wash.; and expansion of chlorine and caustic at Portland and Tacoma.

A \$28-million ferronickel smelter is to go into production this year in southern Oregon.

A small ammonia plant has been built at Tacoma to use by-product hydrogen. Now the region's first major plant to make anhydrous ammonia and urea has been an-



ELLIOT MARPLE is one of the many people who moved to the West after the war. He established a business news bureau in Washington and publishes a newsletter devoted to developments in the Northwest.



nounced for the Columbia River near Pasco, Wash.

Option on land for a second ammonia plant has been taken on the lower Columbia River by Consolidated Mining & Smelting Co. of Trail, B. C.

Forest Industries: Employment in the big timber industry has grown recently, but primarily because of increased production of diversified products such as plywood, hardboard, wood fibers, and pulp rather than lumber.

Consumer Industries: Rapid buildup of the region's population has brought new markets for manufacturers of consumer goods such as candy, furniture, apparel, paint, soap, brick, and appliances.

Most striking examples are two oil refineries now under construction. The first of these, by General Petroleum Co., located north of Bellingham, Wash., is to be put in production late this year. Construction of the second, by Shell, near Anacortes, Wash., has just begun. A third and smaller refinery is scheduled for Tacoma.

Insurance is also one of the area's fastest growing consumer industries. There are now 24 insurance companies, each with more than \$1 million in assets, which have home offices in the Pacific Northwest. Total assets of this group have passed the \$500 million mark.

In the years ahead four different factors will govern development of the Northwest economy:

(1) Power and water remain basic resources of first importance, regardless of the present shortage. Even though costs of construction have risen sharply in recent years, the streams of the Pacific Northwest remain the nation's cheapest source of electrical energy.

Federal development of new projects has slacked off, but operating utilities in the three states are now working on new projects that would be too large for any one or two utilities to handle.

Abundant fresh water for industrial processing is another asset many people in the Northwest believe will be increasingly important as other areas of the nation run short.

(2) Gas and coal as additional sources of energy should stimulate growth in the years ahead. The granting of a Federal Power Commission permit this past summer should bring natural gas to the region within 2 years.

(3) Agriculture is expanding. This means larger markets for machinery, equipment, fertilizer, and other industrial products. It also means a greater flow of income into the region in return for farm products.

Frozen foods are also becoming a bigger factor in the Pacific Northwest. This trend is creating larger markets for the packaging industry.

(4) Expanding population provides larger markets and assures further growth in consumer industries.

People are stopping and staying because . . .

Intermountain Area Has Struck It Rich

Uranium mining is most spectacular development in Intermountain States . . . Area is chief domestic ore source, second only to Congo in total output . . . But less-talked-about oil is also booming . . . Stress is on finding new fields to be tapped when older fields run dry . . . Denver sets pace for buildup in Colorado, Montana, Wyoming, New Mexico area . . . Economy solidly based on industry, agriculture . . . Climate, scenery attract tourists, many stay on—By *W. Hosokawa*.

♦ NOT SINCE Gold Rush days of a century ago has the Intermountain West seethed with such economic activity and optimism. The boom is on, not in one but many fields.

Most spectacular development is in uranium. In the little weather-beaten towns of the desolate Colorado plateau, uranium millionaires are made overnight. Everyone has a chance to hit it rich. Old prospectors in battered jeeps vie with eastern greenhorns and giant mining corporations for a share of the wealth.

And often it's the little fellow who makes the discovery and sells his claim at a whopping profit to someone with the capital to develop it. An example: Vernon Pick, an impoverished prospector 2 years ago, stumbled on a huge uranium deposit. A few months back he sold out to Floyd Odlum's Atlas Corp. for \$9 million.

Once the ore is located, uranium production is a sure-fire proposition since the government guarantees to buy all of it above a minimum quality. Every new mine means more roads have to be built to haul the ore to mills as the

Atomic Energy Commission feverishly stockpiles the precious mineral.

Grand Junction, once an easy-going fruit shipping town in western Colorado, today is the bustling uranium capital of the nation. Most of the prospecting and mining has been centered in the Four Corners country where Colorado, New Mexico, Arizona and Utah meet. This area is America's chief domestic source of A-ore, second only to the Congo in total output.

More Uranium in Wyoming

Now there are indications that Wyoming will yield a similar uranium bonanza. Recent finds in the Black Hills, and in the desert near Casper and Lander, promise activity that may dwarf Colorado's.

Overshadowed by uranium, but booming along nonetheless with tremendous momentum, is oil. The emphasis today is on locating reserves to be tapped at some future date when older fields begin to run dry.

Scores of wildcats are being drilled—and oil is being hit—in

the vast Denver-Julesburg Basin of northeast Colorado, in Wyoming's Powder River and Big Horn Basin areas, in southeastern New Mexico and the Williston Basin on the Montana-North Dakota border.

New pipelines, like the Platte, which handles 110,000 bbl a day, are helping to solve the big prob-



BILL HOSOKAWA has to know what's going on in the Intermountain area. He's been a staffer on the *Denver Post* for 8 years and is also editor of the paper's regional rotogravure magazine.

Intermountain Area Is Growing Fast •

Colorado

- ▶ Since 1940 per capita income in Colorado has risen from \$521 per year to \$1675—a 221 pct increase.
- ▶ Nonagricultural employment has jumped 79.8 pct since 1939.
- ▶ Population from 1940 through 1953 has increased by 26 pct.

Montana

- ▶ In 1939 nonagricultural employment in Montana totaled 108,400 compared with 154,000 in 1953.
- ▶ Per capita income in the state has soared 194 pct since 1940.
- ▶ Population has grown 10 pct—from 559,456 in 1940 to 614,000 in '53.

Wyoming

- ▶ Per capita income in Wyoming has jumped from \$604 to \$1650 since 1940.
- ▶ Population has increased 22 pct since 1940.
- ▶ Nonagricultural employment has gained 56.8 pct since 1939.

New Mexico

- ▶ Of the four Intermountain states New Mexico has shown the greatest gain in per capita income since 1940. Increase has amounted to 277 pct.
- ▶ Population in the state has jumped 43 pct since 1940.
- ▶ Nonagricultural employment is up 123.8 pct since 1939.

lem of how to move Intermountain crude to midwestern consumers. In western Colorado, Federal Power Commission approval of a pipeline to transport San Juan Basin natural gas to the Pacific Northwest has touched off considerable new interest in gas well drilling.

Tourist Trade Counts

Two of the mountain country's most popularly appreciated resources, climate and scenery, are contributing mightily to the boom in several ways.

First, they attract tourists—at the rate of 4 million a year in Colorado alone. And, second, many of these visitors (including the Air Force people who picked Colorado Springs for their academy) are coming back as permanent residents. Of metropolitan Denver's 600,000-plus residents, about 20 pct arrived in the last 4 years.

Denver, as capital of the Rocky Mountain Empire, both reflects and paces the region's growth. These are some of the more spectacular developments resulting from the huge mountain influx:

† During the summer of 1954,

residential developments totaling 18,200 homes, costing more than \$305 million, were started or put on the drawing boards in metropolitan Denver.

† Total buying income in metropolitan Denver is up 59 pct over 1950.

† Increases in retail sales range from 8 pct above 1953 in general merchandise stores to a phenomenal 69 pct in filling stations, 36 pct in home furnishings, 34 pct in food stores.

† Denver building permit valuation as of mid-September was 12 pct ahead of the record-breaking 1953 pace.

Basis for Prosperity

Nor is Denver unique in its growth. Cities like Albuquerque, Colorado Springs and Casper are experiencing tremendous growth for the same basic reasons that Denver is booming.

Underlying this sensational expansion, and a solid hedge against depression, is a solid agricultural-manufacturing economy.

Income from agriculture in Colorado last year totaled \$534,327,000, high for any of the state's industries. Although this year's

drought will reduce income in some areas, vast irrigation projects insure near-normal crops in the most productive sections of the state.

More irrigation projects will lead to wiser, more complete use of western water resources.

Industry, strangely enough, ranks second to agriculture in Colorado with income last year amounting to \$410 million. This category includes everything from food processing to steel.

Light manufacturing in "smokeless factories" adds a rapidly increasing share to this total. Among products exported to all parts of the country are fractional hp electric motors, aluminum pistons, industrial ceramics, V-drive belts and tires, shock absorbers, aircraft parts, fire extinguishers, insecticides, luggage, special farm and mine equipment, western clothing, fishing and hunting gear. All are products that require skilled craftsmen.

The Intermountain West was once the American hinterland, a scenic vacuum through which people sped while hurrying from coast to coast. They are stopping now. And staying.

Northern California, Nevada, Utah . . .

Expansion—Wherever You Look

Trends are different, pace varies, but expansion is the basic theme for Northern California, Nevada, Utah . . . San Francisco Bay area can't match Los Angeles' increases in population and production, but it does serve as the western marketing and financial center . . . Utah is the West's transportation hub . . . Silver, copper, titanium give glitter to Nevada—By T. M. Rohan.

♦ **THE NEW WORLD** of the West is as full of promise for the future as the East and Midwest were for the thousands of immigrants who came to the U. S. in the last century. Like them, millions of Americans have moved "out West" hunting for a better way of life.

The story of the West is one of unparalleled expansion of population, agriculture, industry and commerce. Typical of this growth is Northern California.

Few people in the area realized how great an expansion would take place during World War II, and fewer still thought it would last when the war was over.

Those who guessed right expanded before eastern firms opened up branch plants. But most of the postwar expansion of the West is a result of eastern firms moving in.

What Bay Area Offers

In the same way that a good part of the money from the 1849 Gold Rush gravitated to San Francisco, the focal point of the West's postwar economic development has also been the Bay area.

Although expansion of population and production has been considerably greater "down south"

in the Los Angeles area, strategic geographic advantages have made the colorful Bay area the marketing and financial headquarters of the West.

Communication facilities, engineering talent, and land, air and water transportation have made San Francisco a main hub for the entire Pacific Basin. The city is home base for 7 corporations with



TOM ROHAN really knows the West and its industries. Until he recently took over the Cleveland district, he was Iron Age West Coast Editor for several years.

assets of over \$1 billion each and is headquarters for 23 others with assets of \$35 million to \$760 million.

Population in the Bay area has gone up 77 pct, an increase of 1.5 million people since 1940. It is currently the seventh ranking U. S. market area and a recent survey indicated it would be fourth by 1960.

The western steel industry in which the Bay area plays an important part has undergone considerable expansion in recent years and now fills 60 pct of the West's demand. Industry's growth since 1936 has outpaced the rest of the nation by a wide margin. In the past 18 years, capacity has jumped from 1.97 million tons to a capacity of approximately 7 million tons. This has raised the 11 Western states' share of national steel output from 2.4 pct to 6 pct.

Northern California has been largely bypassed by the airframe bonanza which has boomed Southern California and Seattle. But in electronics, shipbuilding, engineering and research, world commerce, mining and construction it has paced the West.

Bay area shipbuilding pulled in almost 200,000 workers in the heyday of World War II but the in-

dustry has been largely in dry-dock since then. Major drawback has been the necessity of hauling heavy propulsion machinery, boilers, etc., from other areas.

Northern California like all the West is still building at a tremendous pace. Southern Pacific RR has invested \$542 million since 1945 and has had two new industries locate on its tracks every day since V-J Day. And the state's highway construction budget this year is \$205 million, one of the highest in the country.

Utah Is in Transition

Almost 700 miles east of San Francisco is the Brigham Young country in the lush valley of the Great Salt Lake. Brigham Young told his Salt Lake City followers to stick to farming and forget mining since only a few would get rich and the rest would starve. But today mining is one of Utah's most vital industries.

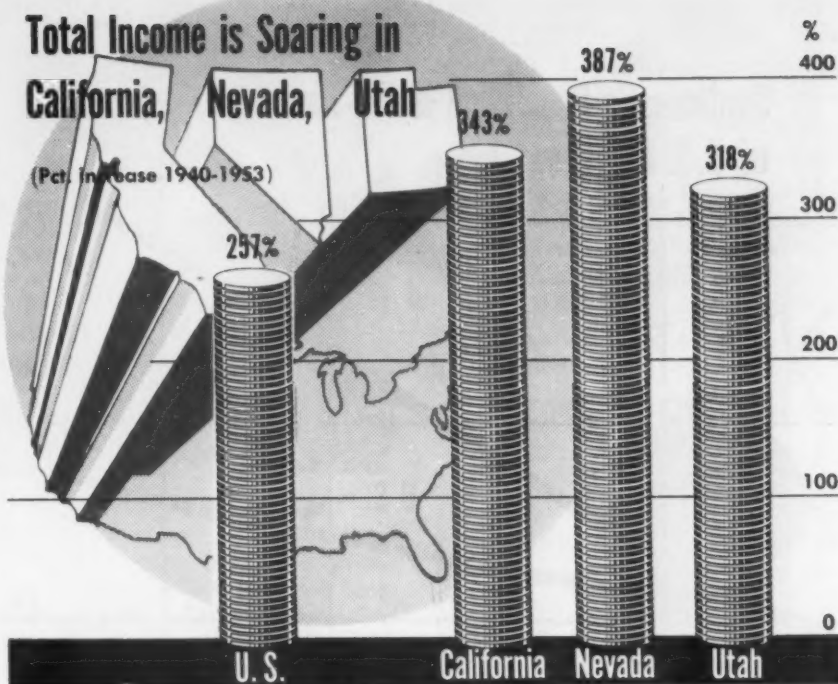
The state is also the nonferrous smelting center of the U. S., home of the West's biggest steel mill, a fabricator of steel plate and structural products and a transportation hub for the entire western slope.

Perhaps in no part of the West is the transition from agriculture to industry shown in such sharp contrast. In the heart of peaceful pastoral country with a backdrop of spectacular mountains are huge copper smelters, blast furnaces and fabricating shops.

Importance of mining is evident from the fact that Utah ranks ninth in the nation in value of mineral products. A single Utah mine produced about a third of all copper mined in U. S. in '53.

Low grade copper ore from the Utah Copper Mine is concentrated at Magna and Arthur, U., and the concentrate is reduced to ingots at Garfield, U. A new copper refinery and anode plant were built in 1950, paving the way for new local copper fabricating industries.

Another plant at Tooele serves mines in and around Utah handling copper and lead concentrates, and another at Midvale handles lead, zinc and silver ores. Milling is also done at Bauer and a cobalt refinery has been con-



structed near Garfield and a tungsten refinery has been set up just west of Salt Lake City.

In addition to copper, uranium, vanadium, petroleum, gas and iron, Utah has known deposits of 200 billion tons of coal which makes it one of the major sources for the West. Output in 1953 was 6.3 million tons valued at over \$32 million.

The integrated Geneva steel mill on the shores of Utah Lake is the largest in the West with over 1.8 million tons annual capacity. This has fostered a sizable steelworking industry in the area which absorbs up to 15 pct of the plant's output. Bulk of this is in plate for construction of pressure vessels, oil field supplies and general construction.

Mining Big in Nevada

Bordering both California and Utah is Nevada—perhaps the outstanding example of the West's greatest deficit—lack of water. Although population went up 45 pct between 1940 and 1950, density of population was raised to only about 1.5 persons per square mile.

With the exception of Reno and Las Vegas, population is traditionally clustered around groves of trees indicating oases.

The hardest worked metal in Nevada is still the silver dollar

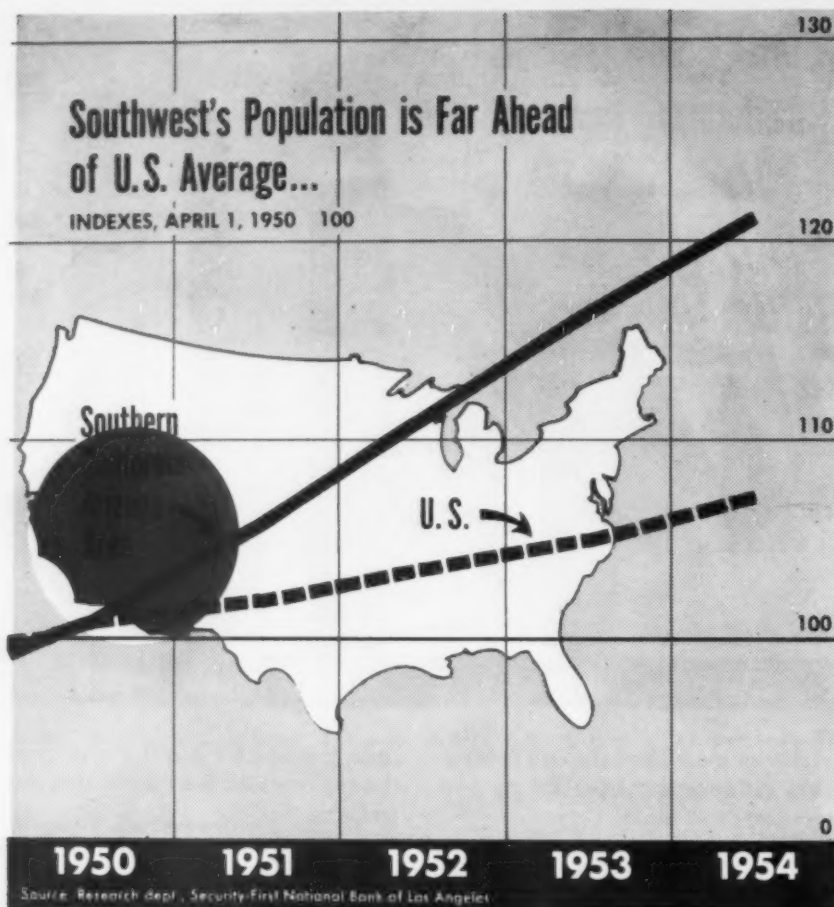
but the state's mining and processing contributions have been substantial.

At Yerington, south of Reno, late last year one of the largest low grade copper mines in the U. S. was started with an investment of \$38 million.

At Henderson, Nev., outside Las Vegas, is one of the two leading producers of titanium sponge in the U. S. Using power from nearby Hoover dam and converted wartime magnesium reduction equipment, this plant has reached capacity output of 3600 tons annually after years of experimentation. Almost all the titanium output from this plant is shipped to midwestern and eastern mills.

In recent years Nevada's ideally stable climate has made it into an aircraft assembly center. The steady climate minimizes expansion and contraction of parts which is an important consideration in close tolerance work of this type. Components have been trucked from as far as Los Angeles to Reno, where they were assembled on locally made jigs and then completed sections were trucked back to California.

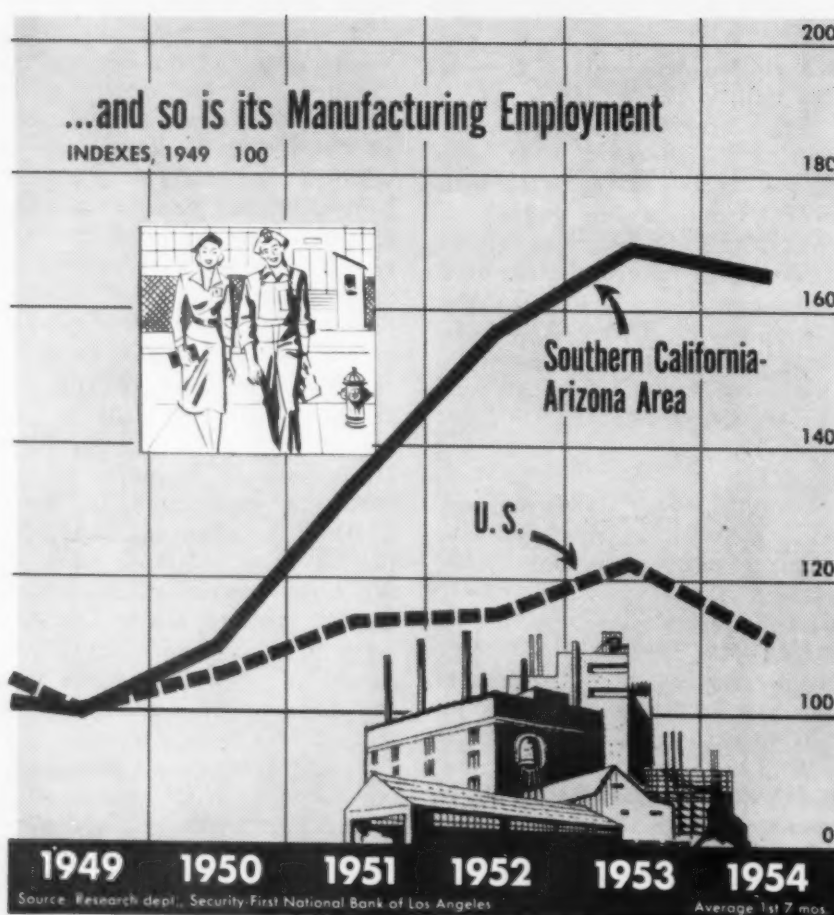
Old prospectors are also making a comeback in Nevada with the uranium boom and Montgomery-Ward's \$49.50 geiger counters are standard equipment in this part of the West.



It's the Southwest ...

Where the Boom Is Busiest

Fastest growing sector in the U. S., the Southern California-Arizona area has the double lure of good climate, employment opportunity ... Aircraft is kingpin—By C. C. Jamison.



◆ THE Southern California-Arizona area is still the fastest growing section in the U. S. In 1900 this area had less than half a million residents. By 1940 the total had climbed to nearly 4.5 million, and in the 14 years since that time, stimulated by World War II and Korea, the population has skyrocketed to 8.3 million.

Net population gain since 1940 has totaled over 3.8 million—approximately the population of Philadelphia and Detroit combined.

Since the 1950 Census, the Southern California-Arizona area has added 1,445,000 to its population, an increase of 21 pct.

Even though recently the rate of growth has subsided somewhat, the gain from mid-1953 to mid-1954 is estimated at 315,000.

Five-eighths of all the population in Southern California and Arizona is concentrated in the Los Angeles metropolitan area (5,212,000 out of 8,334,000). Latest and most authoritative figures show that this area now ranks third among the metropolitan

areas of the U. S. in (1) population, (2) total employment, (3) income, (4) retail sales, (5) wholesale trade, (6) bank deposits, (7) insurance volume, and (8) manufacturing employment.

It is second only to the New York-Northeastern New Jersey Metropolitan area in the total number of motor vehicles and in total volume of construction. It is first in population growth.

Reason for Expansion

Prior to World War II, the Los Angeles Metropolitan area ranked ninth among the industrial centers of the U. S. The 1947 Census revealed that even before Korea the Los Angeles area had moved up to fifth position in manufacturing employment. In 1952 it passed the Philadelphia area and took over fourth place and early in 1954, it moved into third place, ahead of Detroit.

Because of the economic readjustment of the last year all major industrial areas registered a loss in manufacturing employment, but the 2.6 pct decline in the Los Angeles area was far below the national average of 8.8 pct. Reason for this is the strength of the aircraft industry and the continued rapid growth of the local population.

Expansion of Southern California and Arizona is based upon two fundamental factors: climate and economic opportunity. Climate attracts people from all over the U. S. but they do not stay unless they find suitable jobs. For many years, fortunately, the creation of new jobs has kept pace with the growth of population.

Much attention has been focused on the importance of the aircraft industry in providing employment opportunities and in stimulating population growth in this area. The number of jobs in the aircraft and parts industry in the Los Angeles area now totals about 145,000 more than in 1940.

It is estimated that each 100 new jobs in aircraft production resulted in approximately 100 additional jobs in other fields for the local economy. On this basis, the increase in employment since



C. C. JAMISON knows about the phenomenal growth of the Southern California-Arizona area. Vice-president of Security-First National Bank of Los Angeles, he's manager of the bank's research department, editor of newsletter on Southern California business conditions.

1940 traceable directly or indirectly to the aircraft industry is about 290,000.

This means the aircraft industry has been responsible for providing about 28 pct of the more than million new jobs that have opened up in the Los Angeles area during the last 14 years.

More Than Aircraft

Even though aircraft has contributed more to the expansion of the local economy than any other industry, it is still only one of many activities that have caused the phenomenal growth.

In the Los Angeles area, for example, if aircraft employment is excluded from the totals, all other manufacturing industries combined currently employ 16 pct more workers than at the peak of World War II. If both aircraft and shipbuilding industries are excluded, the gain over the wartime peak amounts to more than 60 pct.

The fact that many industries in addition to aircraft are showing significant growth is shown by recent figures on capital investment in new plants and expansions for Los Angeles County.

During 1953 and the first half of 1954, the aircraft industry accounted for \$37 million out of a

total of \$292 million. The other leading industries: petroleum products, \$47 million; foodstuffs, \$41 million; electronics, \$34 million; metal products (except automotive and machinery), \$33 million; automotive, \$16 million; chemicals and paints, \$14 million; printing and publishing, \$11 million; and paper products, \$10 million. All other manufacturing industries combined accounted for \$49 million.

Still Room for Growth

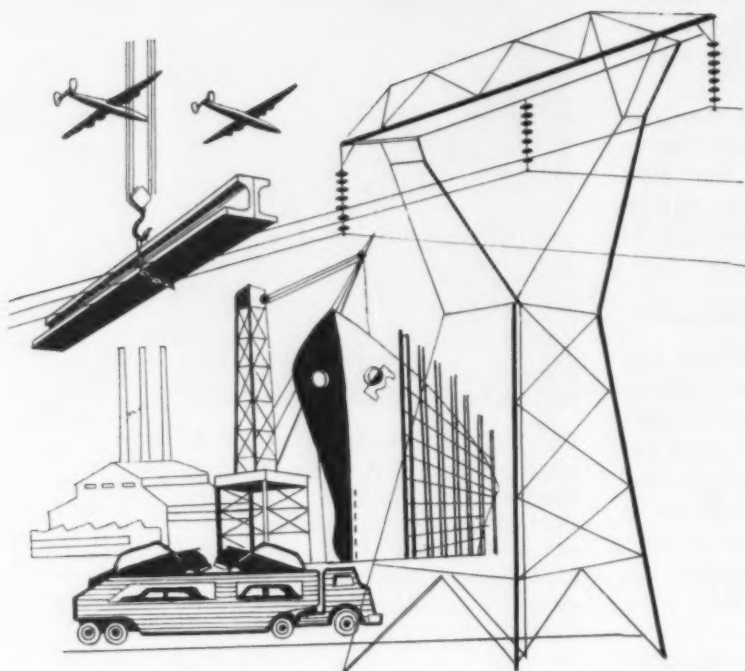
One of the most significant changes in the local economy in the past 15 years has been increased industrialization. The 1940 Census, taken nearly 2 years before Pearl Harbor, showed that 19.4 pct of all gainfully employed persons in the Los Angeles metropolitan area were in manufacturing. By 1950 this figure increased to 25 pct, and at present manufacturing accounts for approximately 31 pct of total employment.

Prior to Korea, the Los Angeles area was somewhat less industrialized than the U. S. as a whole. Now it is above average.

However, taking the Southern California-Arizona area as a unit, the percentage of the local labor force engaged in manufacturing is smaller than the U. S. average. And this area still ships in a larger volume of manufactured goods from the balance of the country than it ships out.

Due largely to freight costs and the increasing size of the local market, more and more eastern and midwestern concerns are establishing production facilities in this sector. Many are finding a local factory the only means of maintaining their competitive position in the third largest market in America.

The potential for industrial growth in the Southern California-Arizona area during the years ahead is suggested by two factors: (1) the area's population undoubtedly will continue to grow at a rapid pace, and (2) the percentage of the local labor force engaged in manufacturing probably will approach or equal the national ratio.



What figures tell about the West . . .

Sensitive Indicators of Expansion Show Tremendous Growth in the West

All the important growth indicators show West has been expanding faster since 1940 than the U. S. as a whole . . . And there is no sign that its edge over the U. S. average is diminishing . . . Big gains are shown in rate of increase in motor vehicle registrations and value added by manufacture . . . People made the statistics—and people are still pouring into the West.

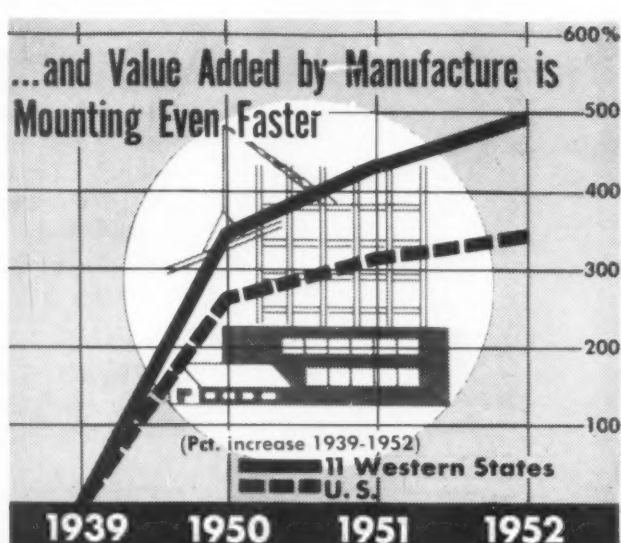
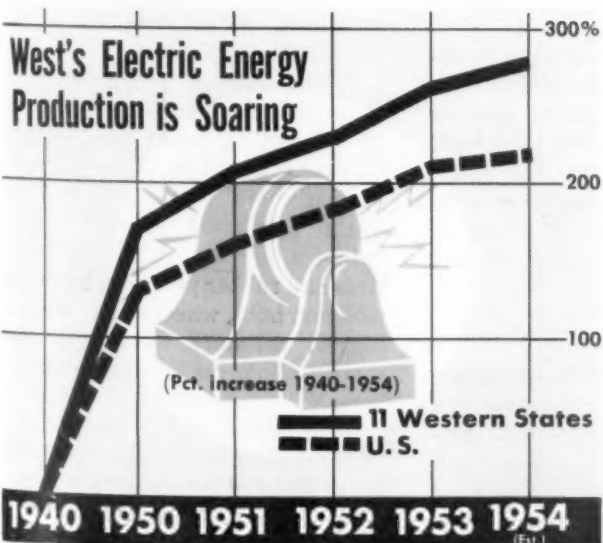
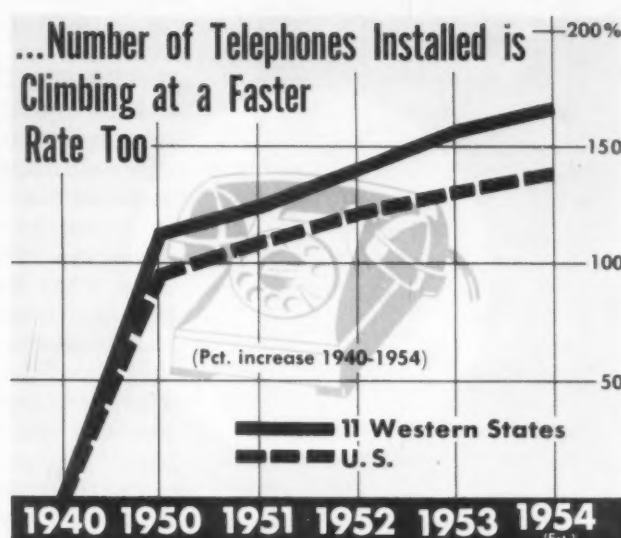
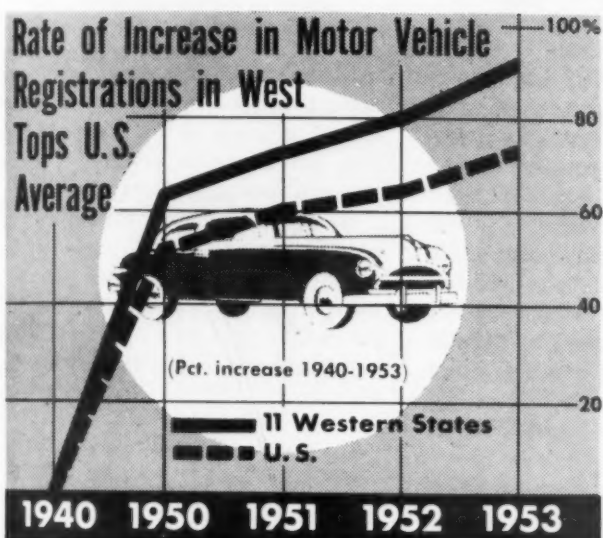
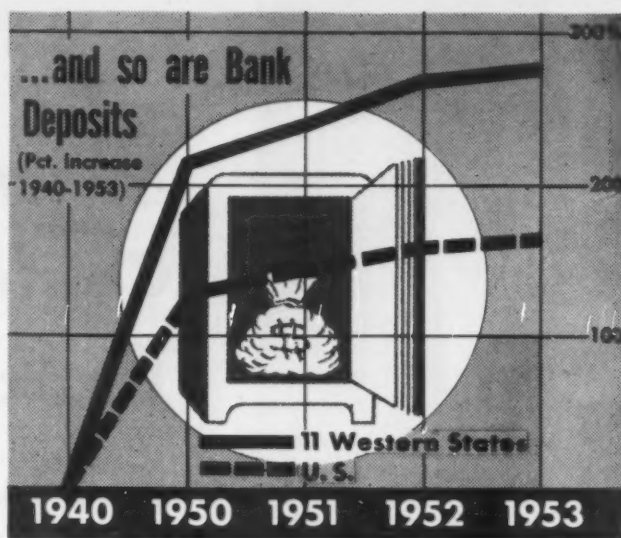
◆ WESTERN growth in the past few years has not slowed up. Preliminary estimates for 1954 of important economic trends indicate little if any change in the gap between U. S. averages and those for the 11 western states. The West is still ahead.

Charts on the next page cover sensitive growth indicators and show the percent increase in activity for the various categories since 1940 for the U. S. and the 11 western states. The West, of course, starts with a

relatively low base in 1940 compared with overall U. S. figures.

But the charts do show a steady growth for the West at a rate considerably above the U. S. average in everyday items such as number of telephones, electrical energy production, income, value added by manufacture, auto registrations, bank deposits.

People make these figures—and people keep pouring into the West.





Auto output is expanding in . . .

California— Detroit of the West

California has benefited most from the automotive decentralization program . . . In 1946 only 200,000 autos were assembled in California . . . This year, even though market is depressed, assemblies will hit 500,000 . . . But growth will slow—By R. D. Raddant.

◆ THE WEST COAST has become a Gold Coast to the auto industry. This is particularly true of California, which has led the nation in auto registrations since 1940.

Growth of the industry's Far West operations has been rapid since World War II. Since 1946 output has risen from about 200,000 units annually to a peak of 650,000 in 1950. This year, in a somewhat depressed market, California assemblies will total about 500,000 cars.

In making these cars, the auto industry will buy nearly \$200 million worth of parts from more than 3000 suppliers. Furthermore, assembly operations by Ford and General Motors are being expanded to handle a far greater number of cars in future years.

But from here on, growth is apt to be more gradual than sudden. The new production capacity will enable California plants to build enough cars to satisfy the entire Far West market and growth of assembly operations will then be geared to the expansion of the market.

Use Little Steel

The auto industry in California is also a major source of frustration to western steel producers. It consumes no more than 3 pct of western-made steel compared to 20 pct nationally. This is because most of the assembly plants receive entire

bodies, finished stampings, and component parts from their Midwest manufacturing plants and purchase only small special stampings from western manufacturers.

Result is future expansion of automotive and supplier operations in the West, hinges both on the growth of the market and on the possibility that more parts will be manufactured on the far side of the Sierras.

Decisions, Decisions

Taking the Ford Motor Co. as the first example, Fords are assembled at Long Beach and Richmond while Lincoln-Mercury has its assembly plant at Los Angeles. The Lincoln-Mercury plant is being expanded while a new plant now being completed at San Jose will replace the Richmond plant.

Ford's current purchasing program calls for annual expenditures of \$50 million which goes to 2000 California suppliers. General Motors spends more than \$100 million. Parts purchased include wheels, bumpers, springs, soft trim, paint, tires and rubber products, batteries, molding, hubs, wheel drums, wiring, hinges, radiators, brake cylinders, steering linkages and small stampings.

Auto executives in Detroit and Dearborn are constantly faced with the problem of determining whether to buy or make each different auto part and then they have to decide



DICK RADDANT, IRON AGE Detroit editor, is a top automotive writer and is in constant touch with the latest developments and trends in the industry.

where to make or buy these parts.

The dual problem in most cases is a complex one involving freight and tooling costs. Unless the auto industry's western assembly operations are vastly expanded, it is extremely doubtful that it will be practical to construct stamping plants such as those of the Midwest.

Terneplate Lacking

Even with the high cost of freight, it is more economical to make the stampings and component parts in the Midwest than to make a tremendous tooling investment in the West. Because of the organization of the large automotive companies, West Coast tooling would in most cases constitute duplication of present plants which are already large enough to serve their respective company's entire output.

For smaller parts to be supplied from vendors, a different set of problems exists. Shipment of bulky gasoline tanks from the Midwest for example is costly and time consuming. Facilities for fabrication of these in Los Angeles could be set up with relative ease. The hitch? No terneplate is made in the West.

If all gas tanks for all California-assembled cars could be made locally, accumulated tonnage could be sufficient to justify a hot dip terneplate line. This is currently under study by auto firms, suppliers and steel producers. But since gas tanks and air filters constitute the only major potential market for this

product, it is doubtful if additional tonnage can be accumulated from other sources.

Another major item is in auto frames. These are now shipped from the Detroit area at \$3.38 per 100 lb, a rate that represents a big portion of the cost. Here again available volume is insufficient to justify expensive tooling and high speed presses. Use of aircraft presses has been proposed for making frames and body stampings, but they are generally too slow to be feasible and continued high airframe output has precluded their use.

Block Manufacture Out

Freight on engine blocks is also a continually increasing factor. A major auto firm some years ago probed the possibility of setting up an engine block plant in California based on high grade Mexican ore deposits. Cost of pig iron would have been lower than Detroit plus freight, but volume even then was not up to economy sized proportions.

At present, every auto company has at least one West Coast plant, although reverses sustained by independents have curtailed their output in past months.

Probably more than any other state, California has benefited from automotive decentralization which has resulted in locating assembly operations in 20 of the 48 states.

In General Motors, only Cadillac is not represented, despite the large market, because of its limited production. Buicks, Oldsmobiles and Pontiacs, are turned out at the South Gate B-O-P plant, Chevrolets at Van Nuys and Oakland.

Ford's new plant at San Jose is being tooled for a capacity of better than 800 a day, which is roughly equal to Chevrolet's in potential output. Chrysler has consolidated its automotive operations at Los Angeles where passenger cars from all four divisions and Dodge trucks are turned out. Nash has a small operation at El Segundo, Studebaker at Vernon, and Willys at Maywood.

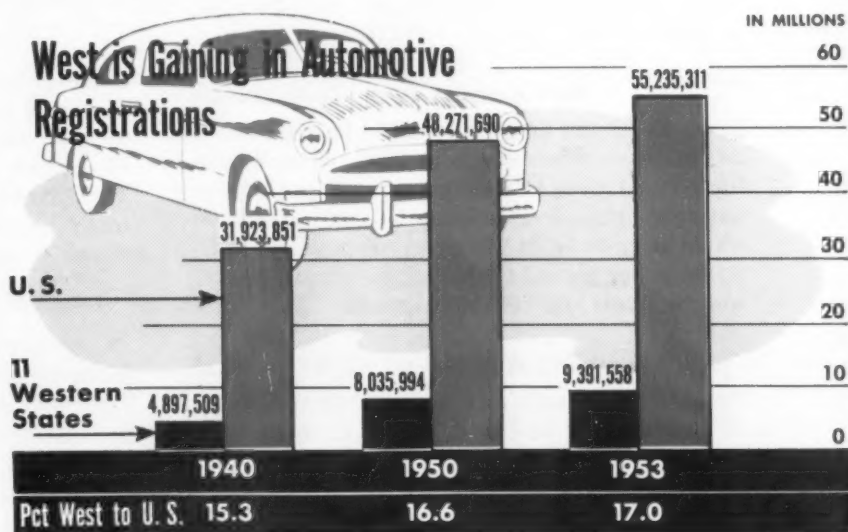
An *Automotive News* study shows that 9.4 pct of all U. S. auto assembly operations are concentrated in California. A tabulation of registrations shows that California's 1953 new car registrations amounted to 7.9 pct of the U. S. total, indicating that the Golden Gate State turns out more cars than it buys. This excess production, however, is not enough to match the combined total new car registrations of California, Oregon, and Washington.

This shows, of course, that West Coast production is now closely tied in with the normal growth of the market that can be anticipated from the natural causes of increases in population and per capita car ownership.

Continue Expansion

Now that California assembly capacities have caught up with the current market, the auto industry may be in for a short period of watchful waiting on their western operations.

One thing is sure, automen will buy or manufacture there when and if it becomes practical. The auto industry is not known for retrenching.



Steel Expansion Will Continue

between 1940 and 1950. Focal point of population is now located near Olney, Ill.

Industry: Has Reason to Go West

Industrialization of the West is moving rapidly, but there's still room for new firms. Pacific Coast now has 10 pct of the nation's total population, 12 pct of its purchasing income, but accounts for only 8.7 pct of value added by manufacture. Industries most needed: electrical machinery, primary metals, textiles.

California Paces Western Expansion

Population of California, already over 12 million, will jump another 25 pct by 1960. Long range view: within the next 50 years California will have the largest population of any state in the nation with more than 30 million residents; Los Angeles may be the industrial heart of America and San Francisco may have replaced Wall St. as the financial center of the U. S.

Los Angeles Has Lead in Plastics

West Coast's thriving aircraft industry which now accounts for about 50 pct of total U. S. output is also responsible for giving Los Angeles the lead in plastics development. Aircraft manufacturers have to use complex dies and yet must amortize them in the course of short production runs. To cut costs plastic dies are being used wherever possible.

Boom Is on in Intermountain Area

Tremendous buildup in the West hasn't been restricted to the coastal states. Since 1940, per capita income of Montana has soared 194 pct; in Wyoming it's been upped 174 pct. Nonagricultural employment in Colorado has increased 80 pct since 1939. In New Mexico per capita income has jumped 277 pct since 1940.

Scrap: West Will Make More, Use More

West Coast's industrial boom means scrap generation will be upped 15 to 20 pct within the next 5 years. Scrap use will soar too because stepped up construction activity, new industrial growth will require increased steel output.

West Has Big Stake in Aluminum

U. S. aluminum demand by 1975 is expected to be five times what it was in 1950. Since Washington and Oregon now produce 35 pct of the nation's primary aluminum a huge expansion would seem to be in the offing. But unless additional power becomes available the Pacific Northwest will lose out on this expansion.

Freight Hikes Aid Western Buildup

Since 1940 cost of freight on shipments from Cleveland to the West Coast has gone up 77 pct on steel storage tanks, 69 pct on refrigerators, 65 pct on auto stampings, 50 pct on auto frames. This gives local plants a comfortable freight umbrella and has been an important factor in the recent industrialization of the West.

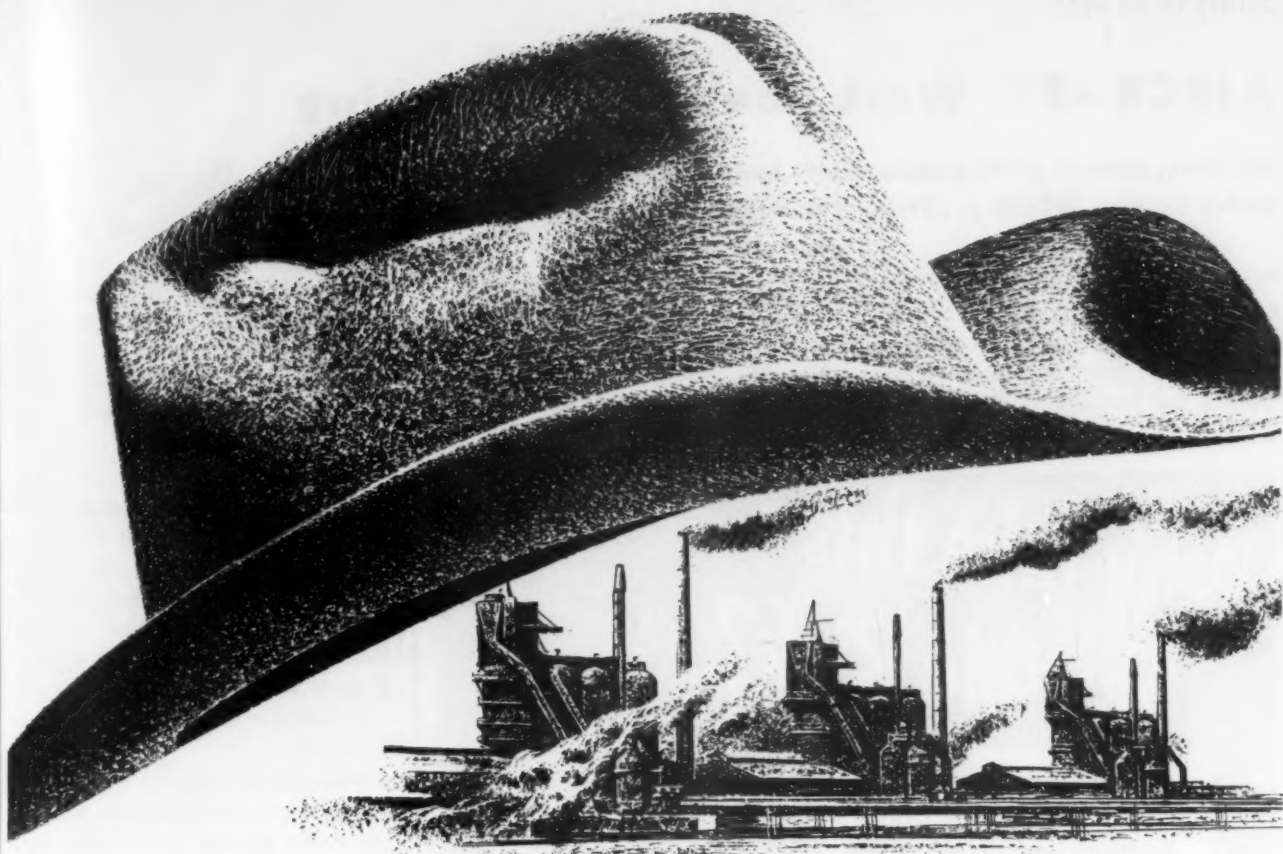
Everybody Has Moved 42 Miles West

Proof of the West's lure is fact that the center of population of the U. S. moved 42 miles west

Will Need Half Million More Jobs

If the population of Washington, Oregon and Idaho continues to grow at its present rate as is expected, the region will require 490,000 new jobs by 1963 and 1,075,000 by 1975.

WANT EXTRA COPIES? A limited number of copies of this special section will be available upon request to Readers' Service Dept., The Iron Age, 100 E. 42nd St., New York 17, N. Y.



The lid's off in the West!

In the West of today the 10-gallon hat is something you see at the movies.

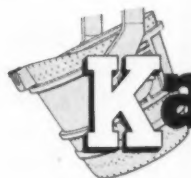
For today the lid is off and western industry is booming! Since World War II the West has—

- invested more than 5 billion dollars in new manufacturing facilities
- boosted manufacturing employment by more than 40 per cent
- increased population almost 25 per cent—more than 3½ million people. *And the West is still growing!*

To keep pace with this growth requires vast quantities of steel. And a major supplier is the Kaiser Steel plant located at Fontana, California, just 45 miles east of Los Angeles.

Kaiser Steel has the only fully integrated steel plant on the West Coast... owns the only three blast furnaces on the Coast... operates nine separate rolling mills... has extensive reserves of iron ore and coal... since World War II has tripled production capacity.

By providing a close-at-hand source of diversified steel products for western manufacturers and other steel users, we have demonstrated over the past twelve years that Kaiser Steel is "built to serve the West."



Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • tinplate • hot rolled strip • hot rolled sheet • alloy bars • carbon bars • structural shapes • special bar sections • semi-finished steels • cold rolled strip • pig iron • ingot molds • coke oven by-products • ferro-manganese • silico-manganese

For details and specifications, write: KAISER STEEL CORPORATION • LOS ANGELES • OAKLAND • SEATTLE • PORTLAND • PHOENIX • DENVER • TULSA • NEW YORK

November 25, 1954

W-17

AIRCRAFT: West Coast Still Booming

Airframe, aircraft parts manufacturers have backlog of \$6 billion . . . Industry employs 250,000 . . . Stepped up missile program adds strength.

♦ **IMPACT** of the aircraft companies or the economic life of the West Coast is terrific. Airframe and parts manufacturers there have a fat backlog of \$6 billion;

produce roughly 50 pct of the nation's airframes; and employ about 250,000. (THE IRON AGE, Aug. 19, 1954, p. 105.)

Plants of West Coast aircraft

companies now occupy nearly 57 million sq. ft. Total amounts to more than 75 million sq ft if the West Coast firms' other plants scattered throughout the U. S. are counted.

The industry is in good shape. Aircraft men admit employment may drop as much as 10 pct in the next year or two, but no important additional production stretchout is expected. Current backlog of orders is equivalent to almost 2 years' production, with additional orders coming in week by week.

The major aircraft companies are doing more and more work in their own plants—large scale subcontracting programs which marked the Korean War production expansion have been curtailed.

Make More Missiles

About 90 pct of the work is for the military. The balance is in transport aircraft (36 passenger and larger), for domestic airlines and for 20 foreign nations. In addition to piloted airplane production, the industry is stepping up its activity in the guided missiles field with several new types now in production.

The extremely healthy condition of the West Coast aircraft industry is indicated in a survey by THE IRON AGE of leading western aircraft manufacturers:

BOEING: This year the company expects to record the highest dollar sales volume in its 39-year history. Employment at Boeing's West Coast plants is around 36,749 and is expected to remain relatively stable in the near future.

Since 1950 Boeing has authorized expenditures of more than \$26 million for new facilities

Why take this Terrible Risk?

Many effective industrial cleaning compounds are flammable. Some of Industry's most disastrous fires (including the greatest) have been caused by the use of these explosive cleaners.



Other types of cleaning compounds are toxic, irritating to skin or lungs—noxious and unpleasant, as well as dangerous.

One Cleaner that has achieved nation-wide use in one short year is **KELITE SPRAY WHITE**. It is non-flammable . . . non-toxic . . . practically odorless. Nearly all of America's largest manufacturers now use it. (A list of several hundred will be sent on request.)

KELITE SPRAY WHITE is patented* . . . unduplicated. **KELITE SPRAY WHITE** is safe to use on nearly all surfaces. **KELITE SPRAY WHITE** easily and safely removes all common soils from all types of equipment—anything from a battleship engine to a white rubber tire. **SPRAY WHITE** is used in the simplest possible way . . . "Spray it on—wipe it off."

Test SPRAY WHITE on your own equipment. Your local Kelite Service Engineer will be happy to demonstrate **SPRAY WHITE** without cost or obligation. **Write or phone today**—no matter what your cleaning problem. Phone **CAPital 2-0201** or your local Kelite office . . . or write Kelite, 1250 N. Main, Los Angeles 12, Calif., U.S.A.



*U. S. Patent
No. 2381124

KELITE

Service Offices in 98 Principal American Cities and 16 Countries Abroad
Manufacturing Plants in
Los Angeles • Berkeley Heights, N. J. • Chicago • Dallas • Mexico City



Southwest STEEL'S long experience, highly trained organization and careful planning in the operation of its modern steel facilities provide for its customers specialized know-how in meeting their exact requirements.

The integration of control from raw materials to finished products gives Southwest Steel the flexibility and availability to render top quality service—for Southwest Steel aims to serve well its many customers in many fields—keeping pace with their increasing needs.

Serving the West with these Electric Furnace Steel and Rail Steel products:

- HI-BOND CONCRETE REINFORCING BARS ● BAR SHAPES
- STUDDERED TEE, PUNCHED-ANGLE and SELF-FASTENER STEEL FENCE POSTS ● MERCHANT BARS and the new addition to our Merchant Bar schedule — HOT ROLLED CARBON ROUNDS!

We invite your inquiries.

Call LOrain 6-2121 or Write

Southwest STEEL ROLLING MILLS

9901 SOUTH ALAMEDA STREET • LOS ANGELES 2, CALIFORNIA

HIGH-PRESSURE DIE CASTING

*"Largest-Most Complete
Die Casting Plant
in the West"*

ALL SIZES . . .

Complete range of up-to-date equipment for castings weighing from a fraction of an ounce to several pounds.

ALL SHAPES . . .

Engineering and production know-how for low-cost, high-production of simple or complex shapes.

ALL ALLOYS . . .

Aluminum, zinc, magnesium and brass alloys cast to certified specifications under constant, integrated laboratory control. Member American Die Casting Institute "Certified Zinc Alloy Plant."

COMPLETE FACILITIES FOR

- DIE CASTING • DIEMAKING
- ENGINEERING • DESIGNING
- MACHINING • ASSEMBLY

CERTIFIED X-RAY, FLUOROSCOPIC
and SPECTROGRAPHIC LABORATORY

PROMPT ATTENTION TO
INQUIRIES FROM ANY INDUSTRY

MEMBER AMERICAN DIE CASTING INSTITUTE

HARVILL CORPORATION

ESTABLISHED 1926

6251 W. CENTURY BLVD.
OPPOSITE L.A. INTERNATIONAL AIRPORT
LOS ANGELES 45, CALIF.
Phone ORegon 8-2121

SALUTE TO THE WEST

and the government has also invested large sums in facilities to be used by Boeing. Firm's order backlog amounts to \$2.35 billion.

The company reports its three West Coast plants are filled with military orders. Plant No. 2 at Seattle is turning out the eight-jet B-52 bomber and doing fabrication work on KC-97 tankers which are coming off the line at the Renton, Wash., plant. Plant No. 1 in Seattle is doing experimental work and producing the small 502 gas turbine engines.

Boeing has invested \$15 million in its jet-tanker transport program and this summer for the first time flew its 707 jet tanker-transport prototype. Air Force has ordered a limited number of these planes which will be built at the Renton plant.

CONVAIR: Is turning out aircraft, guided missiles and electronic equipment at San Diego and Pomona, Calif. The company

believes its San Diego plant may have more aircraft projects in production or under development than any other plant in the country.

Air Force projects include F-102 supersonic all-weather interceptors, T-29C and D Flying Classrooms, C-131A Flying Samaritans, C-131B special test planes, and C-131D transports. Development of guided missiles for the Air Force is also being handled at San Diego. Production of Charactron units and other electronic equipment is now underway.

For the U. S. Navy, Convair-San Diego is building R3Y turbo-prop Tradewind seaplanes, and is developing the XF2Y-1 Sea-Dart and the XFY-1 vertical takeoff plane as well.

Production of Convair-Liner 340 type transports is scheduled to continue at a rate of six per month for the next year.

Turn to Page W-22

"WHERE can I get ALL types of PLASTICS for TOOLING?"



- 1 **TOOLPLASTIK** non-shrinking phenolic casting resin for producing tools and models quickly and economically. ☐
- 2 **DYFORM** reduces cost, weight and lead time in production of high impact tooling. ☐
- 3 **L-900 series** non-shrinking EPOXY resins. 50% cost savings on laminate jigs and fixtures. ☐
- 4 **L-930 NON-SHRINK** surface casting epoxy resin (metallic) for facing metal tools—form blocks—core boxes, etc. ☐
- 5 **CORFOAM**—a foam material for tool core and model structures and high heat applications. ☐

Check and mail this advertisement to . . .

Rezolin, Inc.

5736 West 96th Street, Los Angeles 45, California
DETROIT • DALLAS • NEW YORK

SALES SKYROCKET!



Dramatic Increase in Permanente 165 Open Hearth Bottoms Installed in Last 2½ Years!

HERE'S hardboiled evidence that Permanente 165 *Periclase* Ramming Mix is now regarded by leading steel producers as the world's highest quality material for open hearth bottoms:

After years of development, by 1951 Permanente 165 had gained widespread acceptance. During the succeeding 2½ years, the number of Permanente 165 bottoms installed in U. S. open hearths has more than quadrupled!

This increasing demand is the result of Permanente 165's unmatched *performance* which results in far fewer bottom repairs—and more tonnage at lower bottom cost!

Let your Kaiser refractory engineer provide you with research, design, and installation service to help you obtain all the quality advantages of Permanente 165 *Periclase* ramming mix.

Call or write Kaiser Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway, OAKLAND 12, California . . . First National Tower, AKRON 8, Ohio . . . 518 Calumet Bldg., 5231 Hohman Avenue, Hammond, Indiana (CHICAGO).

Kaiser Chemicals
Pioneers in Modern Basic Refractories

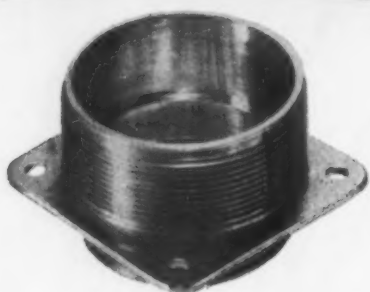
Refractory Brick and Ramming Materials • Dolomite • Magnesite • Magnesia • Alumina • Periclase








November 25, 1954

W-21

SAVE METAL AND MACHINING TIME

WITH
COPPER FURNACE BRAZING
as Cannon Electric does



Cannon Electric Company USED TO make this Aircraft Firewall Connector from bar stock  step by step  machining the entire piece.  An expensive procedure for mass production! (Receptical shell only shown.) NOW Cannon stamps the flange from sheet  and makes the threaded section  on a screw machine from stock tubing. Then they send the parts to  Fabriform who joins them  by Copper Furnace Brazing. Now the finished part is as strong and smooth and bright as the all-machined part—but material and labor costs are cut to the bone, waste metal is minimized and production goes many times faster. That's smart manufacturing. This process can effect similar savings on some of your parts. Fabriform's latest bulletin, which fully describes the process and its applications, will help you decide.



WRITE FOR
BULLETIN
NUMBER 21
TODAY!

**FABRIFORM
METAL PRODUCTS**

Div. of GEROGE GETZ CORP.
7720 MAIE AVE., LOS ANGELES 1, CAL.
Klmball 9261

SALUTE TO THE WEST

Employment at Convair's San Diego plants has doubled during the past five years. In 1950 it numbered 10,775. This year it has been running around 22,000.

LOCKHEED: Company this year is introducing eight new aircraft: the Super Constellation 1049G, already ordered by nine airlines; a commercial all-cargo Super Constellation; the XFV-1, vertical-takeoff U. S. Navy fighter; the U. S. Air Force XF-104 jet fighter; the USAF C-130 turbo-prop cargo plane (to be built at the company's Georgia division); an improved jet trainer of the T-33 type; the newest Neptune in the firm's P2V line, the P2V-7 anti-submarine-warfare aircraft; and the U. S. Navy's turbo prop Super Constellation, the R7V-2.

Introduction of these new models and the rapid growth of the firm's recently established Missile

Systems Div. make Lockheed officials confident of the firm's future growth.

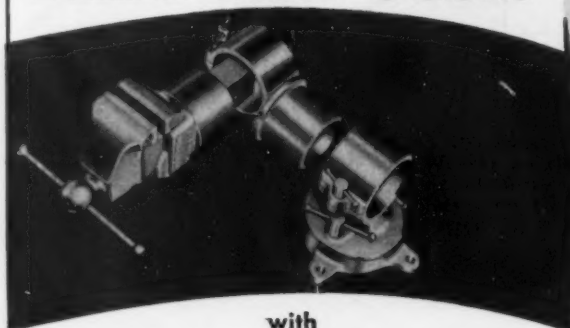
Backlog in mid-1954 was \$1,171,135,000.

Employment has become fairly stable. It reached its all-time peak during World War II, amounting to more than 90,000. Shortly thereafter it dropped to less than 20,000, rose to 35,000 during peak Korea activity and now stands at 27,000. This does not include the firm's Georgia division, which employs approximately 15,000 more aircraft workers.

NORTHROP: Is concentrating a major part of its production efforts on turning out the Scorpion F-89D long-range all-weather interceptor for the U. S. Air Force. The company also has an extensive guided missile program that includes development of the Snark B-62 pilotless bomber.

Northrop's Anaheim, Calif.,

Cut Production Time and Costs



with

FLEXIVISE

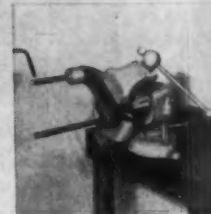
A revolutionary development that saves time, labor and fatigue. Provides complete rotation of 360° in any direction. Positions work to the operator, saving time, labor and physical fatigue. Flexivise is exactly what the name implies; a flexible vise providing a greater range and greater efficiency. 4" jaw width, 5½" jaw opening. Write or wire now for complete information.

FLEXIVISE COMPANY

1149 E. Pico Blvd., Los Angeles, Calif.



Special FlexiSleeve provides a vertical rotation.



Work can be rotated a full 360° and locked in any position.

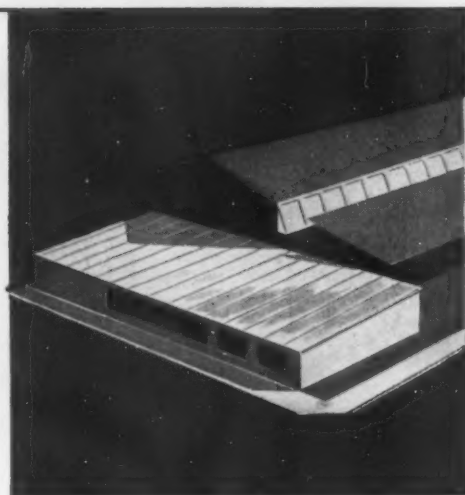


Large unwieldy pieces can be held securely by Flexivise.

Harvey Aluminum will reduce your costs

HERE'S HOW *one manufacturer* **REDUCED SKYLIGHT** **COSTS 47%**

Working with Harvey's engineers and specialists a leading manufacturer* of skylights redesigned his product to take advantage of the multiple function characteristics of Harvey aluminum extrusions. As a result of this teamwork the efficiency of the original design was greatly increased. The 3 main components of the skylight glaze bar were incorporated in a single aluminum extrusion, appearance was improved, weight was reduced enough to cut the cost of supporting material by 50%, labor was reduced 10% to 25%. Harvey offers many other ways to cut your costs. One example is the new Harvey 66S alloy. Write for bulletin today.



The men at Harvey Aluminum are dedicated to the idea of improving your product while reducing your costs. And remember, we prepay the freight to your plant.



Original metal-on-wood glaze-bar involved 157 hand assembly operations. New design involves 37.

*Name on request

MAKING THE MOST OF ALUMINUM...FOR EVERYONE

HARVEY Aluminum

HARVEY ALUMINUM SALES, INC.
TORRANCE-LOS ANGELES, CALIFORNIA
BRANCH OFFICES IN PRINCIPAL CITIES

An independent producer of aluminum extrusions in all alloys and all sizes; special extrusions, pressure forgings, bar stock, forging stock, tubes, impact extrusions, aluminum screw machine products and related products.

November 25, 1954

W-23

Vard

Specialists

IN CUSTOM GEARING FOR INDUSTRY



VARD
hardened and ground
DOUBLE ENVELOPING
WORMS are produced by
an exclusive process which
provides accuracy of con-
tour, surface finish and
hardness unobtainable
by other manufacturing
methods.

*Consider these advantages
of **VARD** hardened and
ground double enveloping
worm and gear sets*

- Custom design
- Production quantities
- Interchangeability
- Accuracy of control
- Higher efficiency
- Economy of space and weight
- Special gear materials

Vard

INC PASADENA 8 CALIFORNIA

SALUTE TO THE WEST

Div. is working on contracts for the Ordnance Corps, and its subsidiary, Radio Plane Co. of Van Nuys, Calif., is producing the OQ-19 radio-controlled target aircraft. In addition, Northrop's engineering program has been extended to cover optics, plastics, metallurgy and electronics.

Employment at the company has risen from a World War II peak of 10,000 to a current total of around 24,000. Backlog, according to most recent estimate, amounted to \$559 million.

DOUGLAS: There has been a tremendous surge in employment at Douglas since 1949 when the payroll listed 19,000 workers compared with a present total of around 62,300. Company's backlog has been in the neighborhood of \$2 billion for the past 2 years and with many of its production aircraft just beginning to go into service the firm believes its backlog will hold around this level for some time.

At its Santa Monica, Calif., plant, Douglas is turning out the Nike, Sparrow I (airframe) and Honest John missiles; DC-6A, DC-6B, DC-7, DC-7B and DC-7C commercial airliners and a military counterpart of the DC-6A Liftmaster (C-118A).

Turn Page



TYPICAL of the West Coast's vital aircraft plants is Boeing's Renton, Wash., facilities where KC-97 Stratofreighters are being turned out. Company plans to gradually substitute production of jet tanker-transports for the KC-97.

heavy jump cut job now turned

4 times faster



Courtesy of Byron-Jackson Co., Los Angeles, Calif.

on Axelson 25" Heavy Duty Lathe

Tough 4140 steel forgings for 300 ton oil drilling hooks having $\frac{3}{8}$ " to $\frac{7}{8}$ " stock and a severe interrupted cut are now turned FOUR TIMES FASTER on Axelson Heavy Duty Lathes, using Kennametal tools. These forgings brinell 311 and weigh 800 lbs. before machining and are only one of twelve different size drill hooks manufactured. More than eight hundred drill hooks have been turned on this Axelson 25" heavy duty lathe since 1945 and it is reported that "no excess machine wear has been experienced and the machine stands up very well." It is also interesting to note that the work is supported on the tail stock by a live center having a #6 morse taper shank.

Axelson lathes are built to stand up to this heavy type work and at the same time will produce to precision tolerances day in and day out. It will pay you to look to Axelson for recommendations on turning problems whether they are heavy duty, high production, or precision. Your welcome request for assistance is without obligation.

Write for literature describing Axelson Heavy Duty Lathes, models B-16", W-20", D-20", E-25", F-32", Precision Tool Room Lathes models 16, 20, or any of the models shown below. 6150 Boyle Avenue, Los Angeles 58, California.



PERFORMANCE DATA

Part	300-Ton Drill Hook
Machine	Axelson 25" Heavy Duty Lathe
Number of Pieces	3 per lot (one of 12 sizes)
Material	S.A.E. 4140 Forging weighing 800 lbs.
Hardness	311 Brinell
Depth of cut	$\frac{3}{8}$ " to $\frac{7}{8}$ "
Greatest Precision	$\pm .0005$ to $\pm .006$
Tool Material	Kennametal 17° lead angle. Tool is set on its side for a 17° negative back rake and 7° positive side rake. The tool post is turned for a 10° lead angle.
Feed	.033" per rev.
Speed	207 SFM
Floor to Floor Time	Approximately 3 hours.
Note	Formerly H.S.S. cutters were used.



HEAVY DUTY



PRECISION



MEDIUM DUTY



GAP BED



ELECTRONIC TRACER



HYDRAULIC TRACER



AXELSON MANUFACTURING COMPANY

DIVISION OF
U. S. INDUSTRIES, INC.
LOS ANGELES 58, CALIFORNIA



DIRECT FACTORY SERVICE AVAILABLE FROM ST. LOUIS, PHILADELPHIA, KANSAS CITY, BUFFALO, AND LOS ANGELES
AUTHORIZED DISTRIBUTORS IN ALL PRINCIPAL INDUSTRIAL CENTERS

THE POWER OF THE PRESS

The far West's mightiest battery of hydraulic and mechanical presses, in the same skilled hands that produce world-famous Norris-Thermador products, are at your disposal. For projects requiring large volume runs of heavy metal stampings, cold extrusions and deep-drawn metal products, military assignments in rocket and ammunition components — for magnetic amplifiers, voltage regulators, pulse transformers, and geophysical applications in the field of electronic development, look to Norris-Thermador.

Ordnance • Electric Bilt-in and Console Ranges • Electric Bilt-in Wall and Portable Heaters • Electric Water Heaters
Evaporative Coolers • Fractional Horsepower Motors • Compressed Gas Cylinders
Auto Wheels • Transformers • Stainless Steel Copper Bottom Cookware • Porcelain-on-Steel Plumbingware • Oil Stoves

NORRIS-THERMADOR CORPORATION

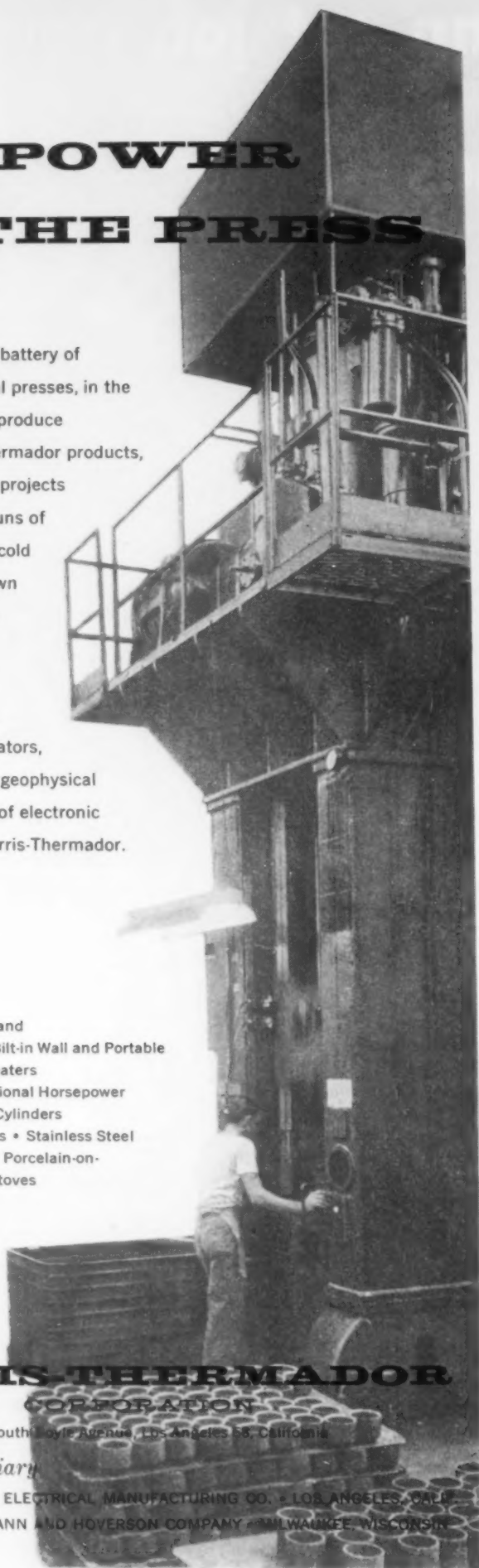
5215 South Boyle Avenue, Los Angeles 58, California

Division and Subsidiary



"SEVEN LEAGUES
AHEAD"

THERMADOR ELECTRICAL MANUFACTURING CO. • LOS ANGELES, CALIF.
A. J. LINDEMANN AND HOVERSON COMPANY • MILWAUKEE, WISCONSIN



SALUTE TO THE WEST

The company's El Segundo, Calif., plant is continuing its 6-year production of AD-Skyraiders and is stepping up output of the newer A3D, F4D and A4D attack and fighter planes for the Navy.

Douglas' Long Beach, Calif., plant has turned out hundreds of the big C-124 Globemasters which continue in production as the newer RB-66 twin-jet light bombers begin to roll out of the same division.

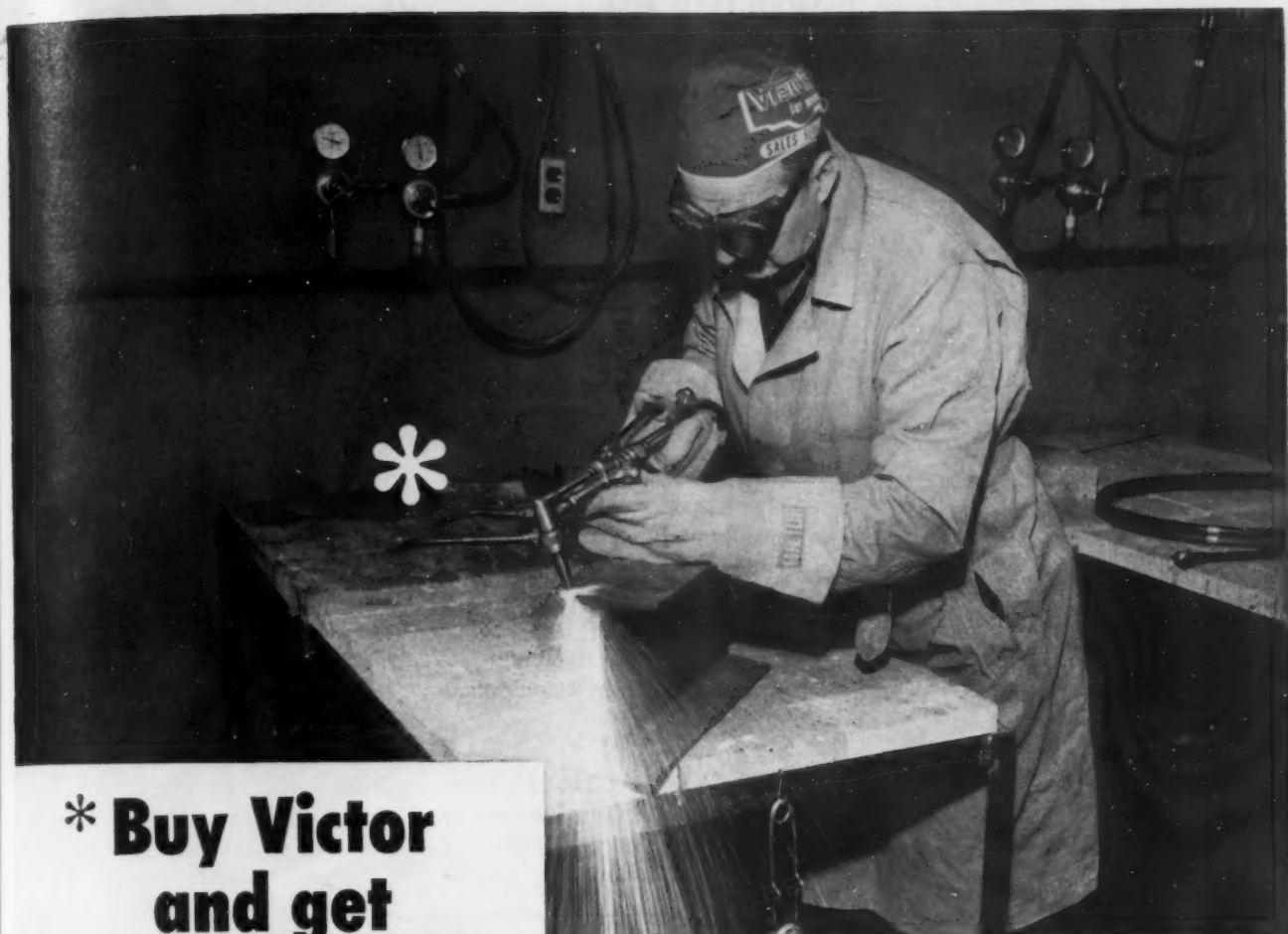
NORTH AMERICAN: Employment at North American's California plants has grown almost without interruption since 1946 when the number of workers totaled 5000. Payroll now covers around 40,000 employees. Company lists its backlog at \$1,075,000,000 and expects to maintain this level at least for the near future.

North American's defense work consists of production of the F-100A Super Sabre which holds the world's speed record of 755.149 mph, the F-86D one-man, rocket-armed jet interceptor, and the F-86K, a sixth model of the Sabre Jet series which is being procured with Mutual Defense Assistance Program funds for delivery to NATO countries. The Air Force also recently placed orders for the F-86K.

At its Fresno, Calif., plant,



"What do you mean fired? I thought slaves were sold!"

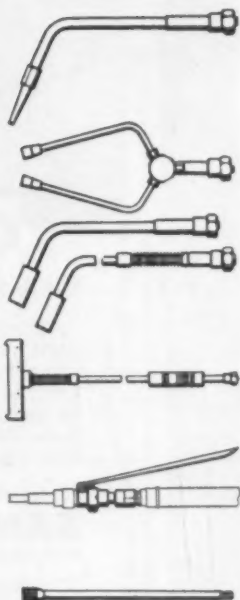


* Buy Victor and get Torch Versatility

Cutting with VICTOR Model 300 Series Torch Butt and Model 2450 Cutting Attachment; cuts to approximately 8".

The versatility of VICTOR torches means you can buy exactly what you need for today's job, then add other nozzles, tips and attachments as required. Your equipment grows with your needs; stays custom-fit to your work. For example, here are a few of the 34 standard attachments for VICTOR 300 Series Torch Butts.

Start right. Buy the versatile VICTOR torch that grows with your job. See it at your VICTOR dealers today . . . or write NOW for Catalog 20.



Welding . . .

Here's one of 10 standard single-tip nozzles available for general welding and preheating.

Heating, Brazing . . .

You have your choice of 11 standard multiple-tip or multi-flame nozzles for preheating, brazing, silver soldering, etc.

Descaling, Flame Priming . . .

Save time and money with VICTOR attachments that fit your exact needs.

Automatic Gas Saver . . .

Shuts off welding gas, keeps pilot light on, saves as much as 75% of total gas consumption.

Nozzle Extensions . . .

Let you handle hard-to-reach jobs, keep you cooler on hot ones.

VICTOR

for welding

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods; blasting nozzles.

844 Folsom Street, SAN FRANCISCO 7 • 3821 Santa Fe Ave., LOS ANGELES 58

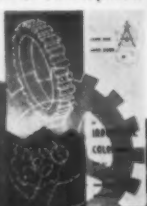
November 25, 1954

you should know

INDUSTRIAL COLORADO
manufacturing is the
second largest industry!

SITE FACTS:
Write for Free
36-Page Analysis
"Industrial Colorado"

Colorado Department of Development
19 State Capitol
Denver 2, Colo.



COLORADO CLIMATE...THE MAGIC INGREDIENT

SALUTE TO THE WEST

North American's early model F-86's are modified, T-6 trainers are remanufactured as modern T-6G's, and spare parts for other North American airplanes are re-produced.

Details of the company's work on guided missiles are classified; however, it is known that a rocket engine capable of developing 50,000 lb of thrust (approximately 5 times the power of jet engines currently in use) has been developed. Guided missiles using such power plants are expected to exceed speeds of 4000 mph.

The company is also engaged in electronics production and as a prime contractor of the Atomic Energy Commission is doing developmental work in the nuclear reactor field.

RYAN AERONAUTICAL: Company is engaged in a wide variety of work including production of pilotless jet planes, jet engine

components, airframe components, exhaust systems, rocket assemblies. Ryan is also conducting titanium research for the Air Force and the Navy.

In the last few years, prime contract work for Ryan has risen from 5 pct to about 25 pct of its total activity. Most of the new work is in the field of research.

Most of the company's subcontracting work involves building aircraft components such as fuselages and fuel tanks, jet engine and afterburner structures, rocket motors.

Just before Korea, employment at Ryan amounted to 1300, hit a high of 4400 in September 1953 and has eased off to a current level of about 3800.

Order backlog is around \$50 million and has been stabilized around that figure for almost a year. Company says deliveries and new orders are now just about in balance.



**NOW...it's only
a one-man job!**

You can work anywhere with the Bux Magnetic Drill Press. This portable unit pays for itself during the first few days of operation. It's anchored in place instantly wherever you have a difficult drilling position. Designed for easy drilling, reaming, tapping and counter-sinking of structural shapes, bar stock, machinery, jigs and fixtures. You'll cut maintenance costs in half and save time on every job.

"Holds still while you drill!"

BUX

MAGNETIC DRILL PRESS

- Stand Weight—only 34 pounds
- Drill Stroke—10 inches
- Will drill up to 1 1/2" holes
- Magnetic Hold—over 800 pounds
- Operates on 115 volts, AC or DC
- Unconditionally GUARANTEED

WRITE TODAY for descriptive literature and name of nearest dealer.

BUCK MFG. CO.
100 Cypress Ave., Los Gatos, Calif.



For light
grinding
and
polishing

GRIND-O-FLEX

THE FLEXIBLE GRINDING WHEEL

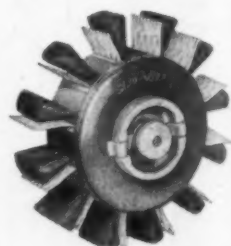
This fast-cutting grinding wheel removes burrs, flash, tool marks from contoured parts without digging into the metal. Consists of hundreds of "leaves" of aluminum-oxide cloth sealed to a core. Attaches to your present power tools or any rotating spindle. No special equipment to buy. Wide range of grits. Safe and easy to use. Mount several wheels side by side for any required width. There's nothing like it.

For finishing complex contours

SAND-O-FLEX

BRUSH-BACKED ABRASIVE WHEELS

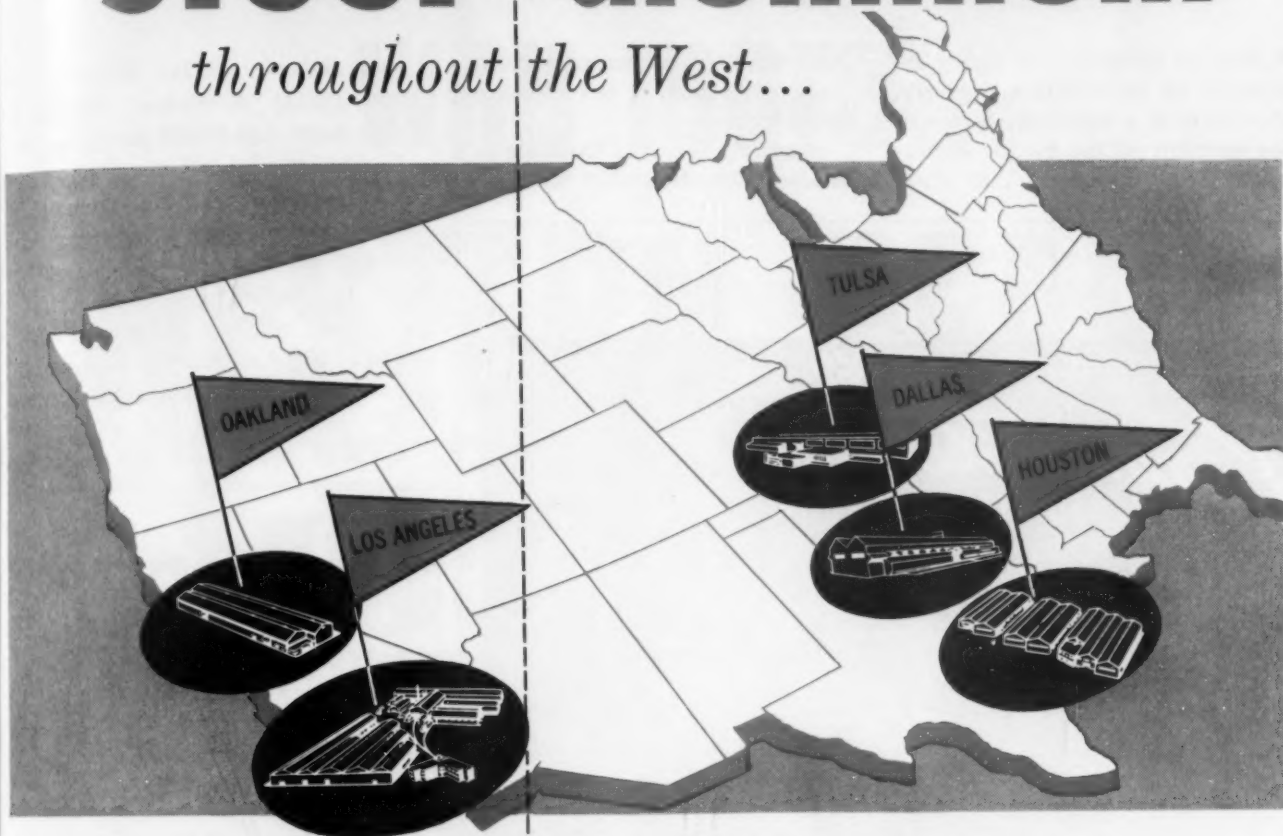
Use Sand-O-Flex for lighter and more intricate contour work on metals, plastics, wood, rubber, etc. Cannot gouge "flat" or mar surfaces. Attaches to motor shaft or power tools. Available in four sizes from portable to heavy-duty production line models. Refill abrasive cartridges range from coarse to very fine for all types of finishing and polishing. Write for catalog and prices.



MERIT PRODUCTS, INC., 4023 Irving Place, Culver City, Calif.

FOR

immediate delivery of steel & aluminum throughout the West...



call JORGENSEN first!

For 30 years, Jorgensen's job has been helping solve Westerners' steel problems. Whether you need speed in getting steel or aluminum from any of Jorgensen's five completely stocked warehouses...or if you want fast, friendly service in the form of technical information, special processing, or help in selecting the right material for a particular job—your best bet is to **Call JORGENSEN FIRST!**

STEEL

Commercial & Aircraft

CARBON - ALLOY - STAINLESS - TOOL
Bars - Strip - Wire
Plates - Sheets - Coils
Structurals - Billets
Open and Closed Die Forgings

ALUMINUM

Full Range of Alloys

Sheet - Plate
Rod - Bar - Wire
Extrusions

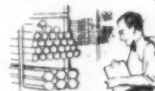


Here's how
JORGENSEN helps you!

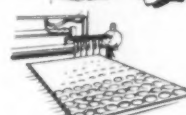


BUY ONLY AS YOU NEED
reduce your raw material investment.

WE CARRY YOUR INVENTORY
give you a wider, more versatile selection.



OUR TOOLS WORK FOR YOU
material processed to your exact specifications on modern cutting equipment.



PROMPT, DEPENDABLE DELIVERY
you need less storage, have more working space available.



TECHNICAL HELP
you get the specialized knowledge of long experience in the field.

EARLE M. JORGENSEN CO.

STEEL

LOS ANGELES
10650 S. Alameda St.
LOrain 7-1122

OAKLAND
1657 W. Grand Ave.
Higate 4-2030

HOUSTON
5311 Clinton Dr.
ORchard 1621

DALLAS
2200 W. Commerce St.
Riverside 1761

TULSA
7311 East Pine St.
85-1511

ALUMINUM: Firms Northwest's Economy

More than 85,000 Northwesterners owe their living to aluminum industry ...
Investment in aluminum facilities averages \$22.5 million yearly.

♦ JUST as California is highly dependent on its aircraft industry, aluminum is a dominant factor in the economy of the Pacific Northwest. It is estimated that more

than 85,000 Northwesterners owe their livelihood to the aluminum industry.

Stanford Research Institute in a study on *The Impact of the Alumi-*

num Industry on the Economy of the Pacific Northwest estimates that more than 20,000 people in the Northwest receive their pay or other support directly from the primary aluminum producers.

Another 32,000 are supported by the fabrication of aluminum into products and by industrial consumption of aluminum. Support of an additional 26,000 stems from the money which the aluminum industry pours into the region's economy for goods, services, transportation and taxes.

Make Big Investment

During the last 13 years an annual average of more than \$22.5 million in current dollars has been invested in Northwest aluminum facilities. This investment has provided income for another 7000 people which brings the overall total of the number of people dependent on aluminum for their livelihood to more than 85,000.

If shortage of electrical power—a serious problem for the area—does not retard expansion of the aluminum industry in the Pacific Northwest the future appears to be virtually unlimited. In making its study of the industry, Standard Research Institute found a number of factors which make aluminum products particularly well suited to the Northwest economy. Among them:

(1) Population of the Pacific Northwest is growing at a much faster rate than for the nation as a whole. This is creating demand for a large volume of construction activity. Aluminum's share in this market is indicated by the fact that just before the Korean War nearly one-fifth of all aluminum consumed in the U. S. went into building materials.

(2) Because of the greater distance between population centers in the Northwest, transportation is

INCREASE PRODUCTION • CUT COSTS • IMPROVE QUALITY

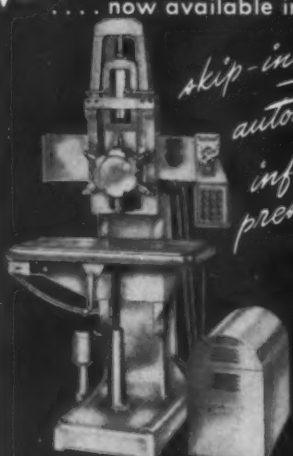
...with

Burgmaster

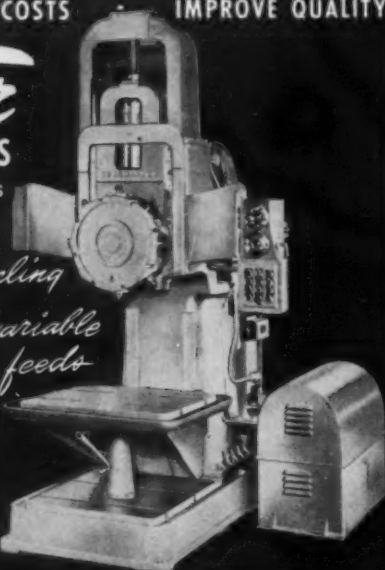
TURRET DRILLS

...now available in 3 models


skip-indexing
automatic cycling
infinitely variable
preselective feeds



6 SPINDLE MODEL 2BH
AUTOMATIC • HYDRAULIC



8 SPINDLE MODEL 3BH
AUTOMATIC • HYDRAULIC



6 SPINDLE MODEL 2A
MANUAL

SPECIFICATIONS:

	MODEL 3BH	MODEL 2BH	MODEL 2A
Drill capacity, mild steel	1 1/4"	3/4"	3/4"
Ram travel	12"	8"	8"
Spindle speeds, preselective	12	12	12
Speed range	115-1700	225-3000	225-3000
Depth control	Preselective	Preselective	Preselective
Throat depth	19 1/2"	12"	12"
Table work surface	25"x 35"	17"x 34"	17"x 34"
Table travel	19"	19"	19"
Max. clearance, spindle to table	32"	23"	23"
Max. diameter tool clearance	9"	4 1/2"	4 1/2"
Motor, 2-speed, 1800/900	10/5 H.P.	2/1 H.P.	2/1 H.P.
Weight, approximate	7000 lbs.	2500 lbs.	1800 lbs.
Height	120"	78"	72"
Floor space, approximate	6'6"x 5'4"	6'0"x 5'1"	38"x 5'1"

B WRITE TODAY FOR DETAILED INFORMATION

BURG TOOL MFG. CO. Dept. IR

P. O. BOX 48, GARDENA STA., GARDENA, CALIF.

Users know
why more
WESTERN GEAR
Speed Reducers
are at work in the West
than all other makes
combined

For additional information, contact Executive Offices,
P. O. Box 182, Western Gear Works, Lynwood, California

PLANTS AT LYNWOOD, PASADENA, BELMONT, SAN FRANCISCO (CALIF.),
SEATTLE AND HOUSTON — REPRESENTATIVES IN PRINCIPAL CITIES.



5435

November 25, 1954

W-31

For MEN OF IRON— a Worthy Opportunity!



POWER

Available water power, 1,358,000 H.P. with huge potential of 11,000,000 H.P. Natural gas in the near future.

RAW MATERIALS

\$165,000,000 a year Mining Industry provides basic and industrial minerals in quantity with great resources untapped.

TRANSPORTATION

Year-round deep-sea ports—four railways—modern highways—airlines to world centres.

PLANT SITES

Industrial sites in all areas for light and heavy industries.

LABOR

Plentiful supply of good skilled and unskilled labor as population increase tops the Nation.

*Write now for further information.
Your enquiry will receive prompt, confidential attention.*

DEPARTMENT OF TRADE AND INDUSTRY

Parliament Buildings, Victoria, B. C.
HON. RALPH CHETWYND, Minister

THE
EYES
OF
THE
WORLD
ARE
ON
BRITISH
COLUMBIA



more important than in the more densely settled sections of the country. And transportation equipment is one of the biggest markets for aluminum.

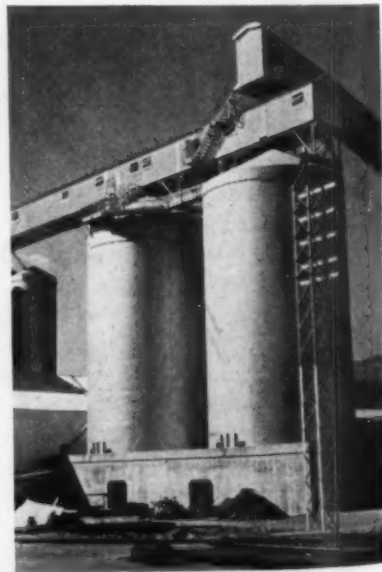
(3) The large food producing and food processing industry of the Northwest offers an expanding market for aluminum products ranging from irrigation equipment, farm machinery, and harvesting tools to food packaging materials.

(5) Aluminum end products of all types are lighter in weight and can compete more favorably in distant markets due to lower freight.

(6) Capital investment in facilities for manufacturing aluminum products is less than for most metals.

(7) The Northwest contains thousands of workers who were trained to handle aluminum during World War II.

(8) The growing population, and its related home building activity, is rapidly creating an important regional market for all types of consumer durable goods and household appliances. This industry is a heavy user of aluminum, and so far the Northwest has not produced its share of these commodities.



GIANT storage bins, each 64 ft high and 38 ft across, store aluminum oxide used at Alcoa's Wenatchee, Wash., Works. Nine bins in use at plant have combined alumina storage capacity of 16.2 million tons.

STEEL: Sets Fast Pace in the West

Western steel capacity has soared 337 pct since 1936 . . . Breakdown of finishing capacity shows industry is young, points direction of growth.

♦ **WESTERN STEEL CAPACITY** has been growing steadily year by year, and even though total U. S. capacity has been climbing at a phenomenal rate, the western

steel expansion has been moving at an even faster pace.

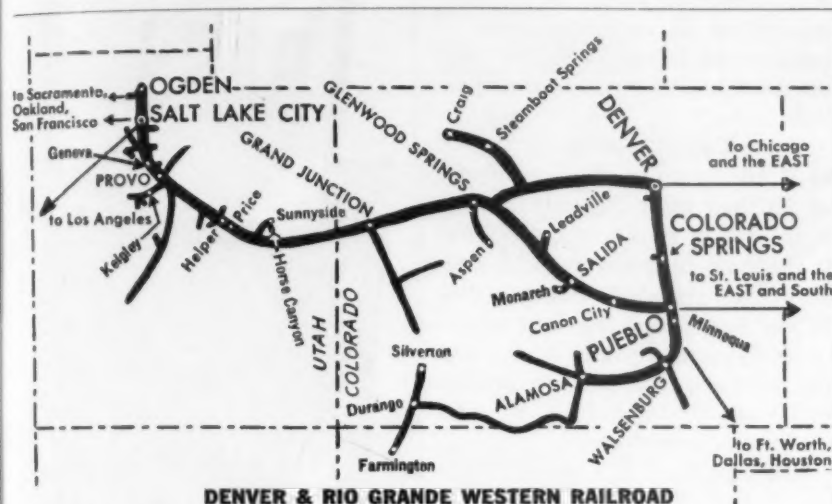
In 1936 western steel capacity totaled 2,034,000 tons, amounted to 2.61 pct of total U. S. capacity.

THE IRON AGE Western District which covers 12 states ranked eleventh in the nation that year. Since then western steel has moved up to fifth position with a capacity of 8,883,000, which is 7.14 pct of national total.

During the same 1936-1954 period total U. S. steel capacity has jumped from 77,852,000 tons to 124,330,000 for a 59.7 pct gain. In comparison, western steel capacity in the last 18 years has increased a whopping 337 pct.

Breakdown of the leading items in the West's finished steel capacity (see table below) reveals some highly significant facts about both the West and the western steel industry.

The high percentage of electric weld pipe and tubing capacity, which amounts to 47 pct of the U. S. total, indicates demand from



Backbone of the West!

VITAL TO THE REGION'S STEEL INDUSTRY, abundant deposits of coal and limestone are found in the Rocky Mountain West served by the Denver & Rio Grande Western Railroad's direct central transcontinental route.

Utilization of these resources and installation of major steel producing plants have been made possible by Rio Grande's network of heavy-duty steel highways . . . a network forming the very backbone of the region.

Since it opened the Rocky Mountain area 86 years ago, the Rio Grande has been a pioneer in progress . . . has worked closely with industries of its territory to bring about realization of the vast potential represented here.

The future, too, is bright, and Rio Grande's modern equipment, direct route and progressive management are pledged to continuing progress . . . to the growth and development of the great Rocky Mountain West.

DENVER & RIO GRANDE WESTERN RAILROAD

THE DIRECT CENTRAL TRANSCONTINENTAL ROUTE

ROUTE OF the Vista-Dome California Zephyr.
The Vista-Dome Royal Gorge.
The Vista-Dome Colorado Eagle.
The Prospector.



Western Finished Steel Capacity

The following table shows the types of finished steel capacity in which the West has a good share of the U. S. total. Breakdown is given as percent of U. S. total for each item and is based on capacities in The Iron Age's Western District which includes 12 states:

West's Pct of U. S.
total capacity

Electric Weld	
Pipe, Tubing	47.0
Reinforcing Bars	36.1
Splice & Tieplate Bars	25.4
Spiral Weld Pipe	
& Tubing	21.1
Standard Rails	18.9
Light Structurals	16.4
Pipe Skelp	14.9
Plate	14.2
Reinforcing Fabric	13.6
Nails, Staples	11.2
Heavy Structurals	9.3

"A Complete Metallurgical Service"

ANALYSIS

TESTING

INSPECTION

CONSULTATION

RESEARCH

METAL CONTROL LABORATORIES, INC.

MCL

PRICE
LIST ON
REQUEST

2735 East Slauson Avenue

HUNTINGTON PARK, CALIFORNIA

KIMBALL 4161

The Leading Metallurgical Laboratories on the Pacific Coast

SALUTE TO THE WEST

the West's growing oil and gas industry for transmission lines.

The high rate of construction activity in the West is shown in the area's 36.1 pct share of U. S. reinforcing bar capacity and the 16.4 pct rating on light structurals. Farm need and construction demand are largely responsible for the West's 11.2 pct share of the nation's nail and staple capacity.

The West also has 13.6 pct of U. S. reinforcing fabric capacity. Still a sleeper as far as tonnage production is concerned, use of reinforcing fabric is on the way up, particularly for road construction.

Overall picture of western steel as it shows up in the breakdown of finished steel capacity is that it is still a young industry that is destined to grow. It is characteristic of the steel industry that in the beginning the first build-up in capacity usually is in reinforcing bars, and light structurals which can be turned out by relatively small producers.

Later on when big, fast-production facilities are installed there is usually a rise in heavy structurals and cold-rolled sheet and strip capacity. This could be the pattern for the West, which now has only 1.9 pct of the nation's cold-rolled sheet capacity, 3.5 pct of its cold-rolled strip capacity—particularly if there is an increase in western automotive parts production.

Acknowledgments

In addition to the authors of special stories in this study the following groups and firms were among those cooperating with the editor: U. S. Dept. of Commerce, U. S. Dept. of Labor, American Telephone & Telegraph Co., Pacific Telephone & Telegraph Co., Mountain States Telephone & Telegraph Co., U. S. Steel Corp., Bethlehem Pacific Coast Steel Corp., Kaiser Steel Corp., Federal Power Commission, Edison Electric Institute, National City Bank of New York, Aluminum Co. of America, Kaiser Aluminum & Chemical Co., Reynolds Metals Co., Colorado Fuel & Iron Corp., "Automotive Industries", Stanford Research Institute, Northrop Aircraft, Inc., North American Aviation, Inc., Douglas Aircraft Co., Inc., Boeing Airplane Co., Convair, Div. of General Dynamics Corp., Ryan Aeronautical Co., Lockheed Aircraft Corp.

**COLD
FINISHED
STEEL
BARS**



**SIERRA
DRAWN STEEL
CORPORATION**

5821 East Randolph Street
Los Angeles • Raymond 3-6431

... of the Northwest
6600 Airport Way
Seattle
RAinier 5961

Quality and Service for
Western Industry

**ONLY INDEPENDENTLY OWNED
COLD FINISHING BAR MILLS
IN THE WEST**



OFFERING YOU ...
THE BEST IN COLD FINISHED BARS

with
Complete Metallurgical Service
Complete Engineering Service
Production Flexibility
Fast Delivery

here's A JOB

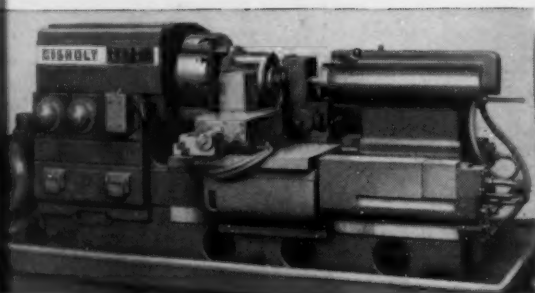
... a tough one!



300-lb. steel forging for final
drive gear and shaft—machined
in 6 separate operations—at
a rate of 1 finished piece per hour.

here's THE MACHINE

... that licks it!



GISHOLT
No. 24 Hydraulic
Automatic Lathe

Here's how Western Gear Works of Belmont, California, solved their problem:

With two longitudinal carriages and two transverse tool slides, the standard No. 24 machine has the flexibility to combine rapid traverse and feed in several directions. Hydraulic controls make it very simple to change setups.

Now, note how tooling costs were cut by using mounting plates instead of special

slotted tool blocks. Large tool bit shanks are slotted, and thus are easily set before final bolting down. The complete riser blocks are quickly interchanged for various operations. And here, again, Gisholt's traditional power and rigidity show up on cuts that pull up to 80 h.p.

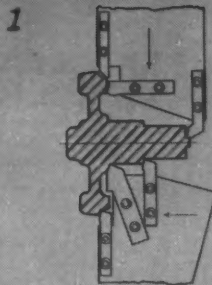
For low costs on tough jobs, think first of the Gisholt No. 24 Hydraulic Automatic Lathe. Write for literature.

GISHOLT

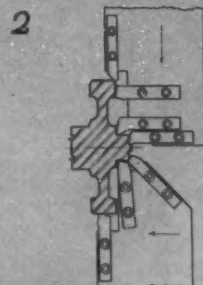
MACHINE COMPANY

Madison 10, Wisconsin

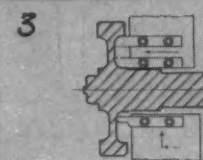
THE GISHOLT ROUND TABLE
represents the collective experience of
specialists in machining, surface-finishing and
balancing of round and partly round parts.
Your problems are welcomed here.



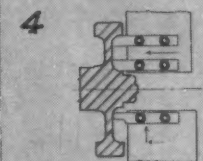
6.6 min.



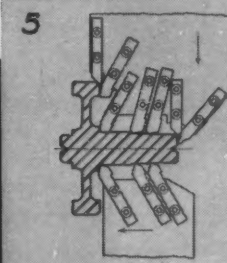
6.5 min.



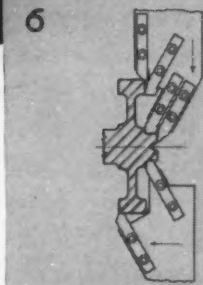
8.8 min.



8.8 min.



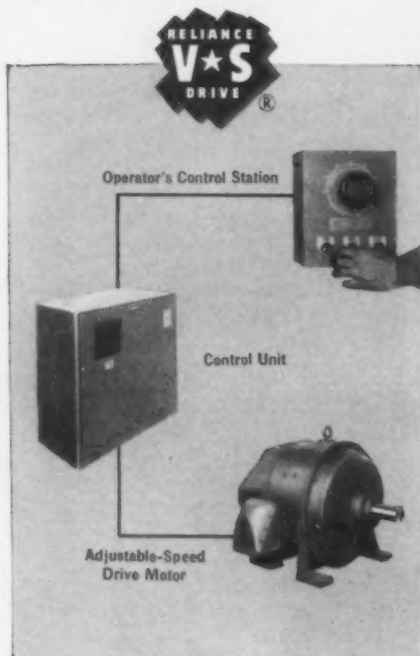
6.7 min.



6.7 min.

RET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

ALL-ELECTRIC ADJUSTABLE-SPEED DRIVE MAKES MACHINERY DO ITS BEST!



Reliance V*S Drive converts waste time to productive time by providing easily adjustable speeds—fast, smooth stopping—inch, jogging or creeping—proper tension control—accurate reversal at any point—with manual or automatic control at the machine or from remote locations. Write for Bulletin D-2311—or contact your nearby Reliance Sales Office.

D-124

RELIANCE
ELECTRIC AND
ENGINEERING CO.

1083 Ivanhoe Road • Cleveland 10, Ohio
Sales Representatives in Principal Cities

TECHNICAL BRIEFS

DESIGN: Build Rugged Lathe

Effect of carbides on modern machine tools felt as designers aim to exploit benefits of improved tools in heavy duty equipment . . . Lathe controls simplified.

A completely new heavy duty lathe recently demonstrated by The Monarch Machine Tool Co., Sidney, Ohio, was specifically designed to permit maximum benefits from carbide tooling on work of considerable size.

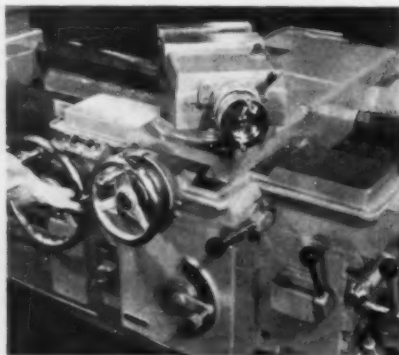
Outstanding feature of the machine is the Dyna-Shift headstock for simple selection of the right surface cutting speed for a given diameter.

With the new shift the operator simply sets two dials, one for the surface cutting speed desired, the other for the diameter to be turned. Instantly the headstock gears shift automatically to produce the correct spindle speed. Subsequent speed changes on progressive workpiece diameters are made just as quickly and easily.

To prevent the ends of the gear teeth from being damaged by meshing, a signal inside the headstock will not allow shifting until the gear train is stopped. At no time is there a speed step-up in a gear pair. Speeds are kept down to minimize wear and efficiency loss.

Electrical Controls Are Grouped

Numerous safety factors are built into the machine design so that work rotation will not start and gear shifts cannot be made un-



Controls simplified . . .

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 115. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

less parts are properly positioned.

All electrical controls are grouped at the front of the headstock and a horsepower meter constantly indicates the amount of main drive motor horsepower being used.

Range of Speeds

The new lathe has a range of 36 spindle speeds from 6 to 750 rpm. Controls for all tool movements are at a natural height for the average operator and are concentrated at the machine apron.

STEEL:

Technical and economic developments discussed.

Continued economic supremacy of molybdenum high speed steels was stressed in a talk given recently before the New York Chapter, American Society for Metals, by George A. Roberts, Vice President-Technology, Vanadium-Alloys Steel Co.

Available supplies of molybdenum in the United States compared with the relatively high cost of foreign tungsten have permitted the molybdenum high speed steels to hold approximately 80 pct of the market in competition with tungsten high speed steels. Prior to World War II, the tungsten types were the standard cutting tool material of American industry.

The speaker pointed out the in-

creasing use of vanadium in high speed steel. Used because of their extreme wear resistance, vanadium high speed steels have been employed more and more by industry in the last 5 years, becoming known as super-high speed steels. Vanadium contents up to 5 pct compare with the standard vanadium content of 1 or 2 pct in the general purpose steels.

The newest development in the tool steel field has been the development of free machining high alloy steels for tools and dies. Sulphur is added to impart free machining characteristics to high speed steels, and these steels are finding some favor for the manufacture of milling cutters and other articles representing complicated machining operations.

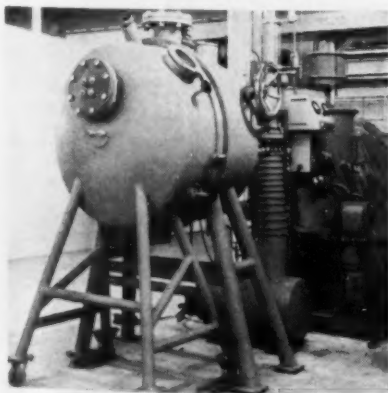
The amount of sulphur used is small, being less than 0.2 pct, but the effects on machining are marked in improving the surface of the machined article as well as decreasing the time of machining by as much as 50 pct.

Melting:

Moderate size vacuum furnace meets pilot plant needs.

A new vacuum melting and casting furnace suitable for moderate-size production of high-purity metals or for experimental and pilot-scale work has been developed by F. J. Stokes Machine Company, Philadelphia, Pa.

The new vacuum furnace, Model 436, has a melting capacity of 50 lb of steel or other metals. The new unit has melted and cast, completely under vacuum, small rods of a nickel alloy. The furnace has



Capacity: 50 lb of steel . . .

Turn Page



JOHNSON BEARINGS

Industry that's going places gets its bearings from Johnson. That's

natural, too. Johnson Bronze is known around the world as Sleeve Bearing Headquarters. Industry can get any type of sleeve bearing, any bearing metal, any size . . . here. And men who know bearing values realize that Johnson Bearings stand for economy in first cost, in application and in performance.

JOHNSON BRONZE COMPANY
505 South Mill Street, New Castle, Pa.



Free!



NEW 8-PAGE BROCHURE ON SCREW MACHINE SERVICES

This new 8-page brochure on Biddle's facilities shows a small part of the plant that is devoted exclusively to screw machine parts production.

If you have immediate needs, your drawings via mail or a call to us will give you an immediate quotation. No obligation, of course.



BIDDLE

SCREW PRODUCTS COMPANY
SHERIDAN, INDIANA

Telephone Sheridan 351
Indianapolis Direct Line MEIrose 5-1243

Metal Stamping Facilities

by *Lansing*

at your Service for...

**ELECTRICAL
EQUIPMENT**

**HOUSEHOLD
APPLIANCES**

**TRANSPORTATION
EQUIPMENT**

**INDUSTRIAL
EQUIPMENT**

**FARM
IMPLEMENTS**

Lansing Stamping Co.

LANSING 2

MICHIGAN

a tilting crucible and turntable on which multiple molds can be supported for semi-continuous casting. It can also be fitted for casting by bottom pouring.

The chamber is a horizontal cylinder 4 ft in diam and 4 ft long. A full-opening hinged door gives complete, convenient, and safe access to the interior of the chamber for charging, maintenance, or the installation of additional equipment. When closed, the chamber and door's mating surfaces are sealed by an O-ring which gives a perfectly tight closure. The chamber, and the door, is water-jacketed. Two sight-glasses in the side walls of the chamber permit the operator to observe the progress of the melting and casting operations.

Sample Through Vacuum Lock

A 3-in. full-opening vacuum lock in the upper portion of the chamber directly above the crucible, contains the bucket which holds the alloying materials to be added during melting. Through this lock the additions can be made, samples taken, and temperatures measured by thermocouples, all without breaking vacuum.

Emptying of the addition bucket, moving the cover of the crucible, dipping and raising the sampler, tilting of the crucible, and rotation of the mold table are all actuated mechanically by manual controls from outside the chamber. Pre-heating or cooling of the molds, to obtain the desired quench rate, and other operations are also controlled.

Optical pyrometer readings of the melt are taken through a sight-tube in the top of the chamber, equipped with a shutter and wiper.

The furnaces can also be used for vacuum sintering.

Uses Booster Pump

The vacuum pumping system for the furnace incorporates a new and more efficient design of a Stokes booster pump, backed up by a Stokes mechanical pump. Two different pumping systems are available, to meet different requirements. Both have capacity to assure rapid evacuation of the chamber.

Coaxial power leads through the side of the chamber will carry a maximum of 50 kw, either of high-frequency current for stirring action or of low-frequency current for resistance heating.

The remote control panel conveniently groups push buttons for all operation. Indicating lights show at a glance the exact condition prevailing in the vacuum system.

Hauling:

New method of securing loads cuts trucking overhead.

A damage-free hauling method that uses seamless tube cross-bars to secure the load in trailers is cutting loading and unloading time by fifty pct.

High reduction of man hours, less damage to the product and less dunnage are the result of the improved system of truck loading methods devised by the National Radiator Co., Johnstown, Pa.

This manufacturer of a wide line of heating products, effectively adapted to trailer use a tested method for securing loads in cargo aircraft to transport, damage-free, the cumbersome cast iron boiler sections and cut the overhead cost entailed in the many manhours needed to load and unload the trucks.

Eliminate Strapping

Under the standard method of loading cast iron products at its New Castle plant, National Radiator used steel strapping, wooden bulkheads, and wood blocking to



Holds load securely . . .

TECHNICAL BRIEFS

prevent over-the-road damage. This included the time-consuming task of draping the cast iron boiler sections with the steel strappings. Additional time was spent in nailing the bracing, blocking, and bulkheads to the vehicle and properly installing them against the lading in the truck.

The answer to these problems was found in adapting to truck use equipment used to secure loads in cargo aircraft.

Use Seamless Tube

The fasteners which go into the half-inch marks had been designed originally for attaching to the ends of heavy canvas webbing or strapping. This was adequate for normal air cargo. But, to support its much heavier boiler sections, National Radiator substituted heavy pieces of seamless steel tubing as crossmembers.

As a test, one length of aluminum extrusion was attached at waist-high level to each wooden side of a 32 ft long semi-trailer. Four crossbars were placed at seven ft intervals to provide tight and compact support between groups of cast iron sections standing up on their own feet. The load also included some boxed parts for heating boilers.

The test trailer load, weighing 26,000 lb, was taken from National Radiator's plant at New Castle to Washington, D. C. This test load is reported to have arrived in perfect condition and was unloaded in about one-half the time it would take for unloading a trailer that had been loaded by the standard method. All a workman had to do was unclamp the crossbar from a spring fastener.

Depending on the type of lading and the length of the trailer, it is possible to install as many as 8 crossbars at 3½ ft intervals. The cast iron sections successfully hauled by National Radiator have ranged from 50 to 1,200 lb in weight, 18 in. to 5 ft tall, two to 12 in. wide, and 1½ to five ft long.

Turn Page

THE ATLAS CAR & MFG. CO.

1140 IVANHOE ROAD
CLEVELAND 10, OHIO

ATLAS
CARS

KNOWN FOR
DEPENDABILITY

SCALE CAR 30-Ton Double Hopper Bottom

Car is equipped with very wide hopper with operator's platform above hopper to facilitate bin gate operation.



Keep your eye on **Buckeye**

for everything new
in air and electric power tools!



**HEAVY DUTY
90° ANGLE HEAD
DRILLS**

LEVER THROTTLE



LOCK BUTTON THROTTLE

For HEAVY-DUTY applications—designed for minimum maintenance, built for maximum service. Compact, lightweight, lowest overall head height—for ease of handling, even in the tight spots.

No exposed moving parts to create a hazard for tool operator or damage to the work piece. All working parts, including bevel gears, bearings and spindle, are separate units, easily and economically replaced—individually—when worn. Available with $\frac{1}{4}$ "-28 or $\frac{5}{16}$ "-24 thread; also with $\frac{1}{4}$ " capacity chuck.

Those are the facts about the NEW Buckeye 90° HEAVY-DUTY Angle Head Drills . . . we'll prove them, in your plant, without obligation. Just tell us where and when, we'll do the rest!

Buckeye Tools
CORPORATION
DIVISION 11 • DAYTON 1, OHIO

producers of
the world's first
successful
rotary air tools

New Books:

"What Every Engineer Should Know About Rubber," by W. J. S. Naunton. Condenses a broad cross-section of information on rubber with the engineer's needs in mind. National Rubber Bureau, 1631 K St., N.W., Washington 6, D. C. 50¢. 126 p.

"America's Spiritual Recovery," by E. L. R. Elson. Dr. Elson's book is a summons to intensify, expand, and give momentum to the "dawning spiritual renaissance," in America. Fleming H. Revell Co., 316 Third Ave., Westwood, N. J. \$2.50. 189 p.

"Practical Refractometry by Means of the Microscope," by R. M. Allen. A text on the determination of indices of refraction of solids by microscopical methods. Methods described can be used for identification of minerals, inorganic substances, organic crystals and other transparent or translucent solids. R. P. Cargille Laboratories, Inc., 117 Liberty St., New York 6. \$1.00. 76 p.

"Contract Termination Guide," Chamber of Commerce of the U. S. Offers a guide through the confusion and inconsistencies of government contract termination settlement. Includes chapters on initiating termination action, steps preliminary to submission of claims, disposition of termination inventory, and settlement procedures. Manufacture Dept., Chamber of Commerce of the U. S., 1615 H St., N. W., Washington 6, D. C. \$1.00. 60 p.

"Electrical Conductor Technical Manual." A comprehensive reference book on aluminum electrical conductor. Gives data on the physical properties and electrical characteristics of all sizes and strandings of aluminum conductor and information on the application of aluminum to overhead distribution systems. Kaiser Aluminum & Chemical Sales, Inc., 228 N. LaSalle St., Chicago 1. 190 p. Available without cost if requested on company letterhead; otherwise, \$2.00.

TECHNICAL BRIEFS

New Films:

"The Marion 191-M." 16 mm color and sound movie features material handling excavators in action. Tells the story of the world's largest shovel on two crawlers. "Marion and You," another film, features the company's entire line. Write to the Advertising Dept., Marion Power Shovel Co., Marion, O.

Seismological secrets of earthquakes and the effect of ground motion on buildings are shown in a 16 mm color and sound movie. Shows the importance of sound engineering design and reveals how steel, in all building material forms, is used in structure to resist seismic forces. 28 min. Bethlehem Pacific Coast Steel Corp., Bethlehem, Pa.

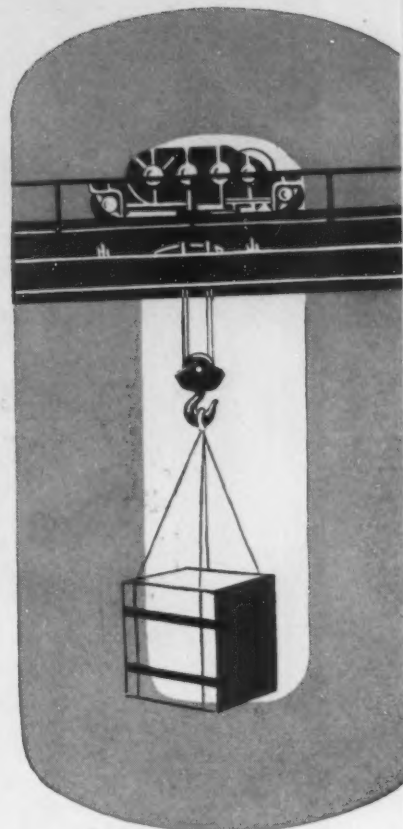
"Scrap: Steel Reborn." 16 mm sound and color film. 13-min. film depicts the scrap man's conservation of natural resources through this vital reclamation service. Shows the endless cycle of preparation for reuse of steel. Identifies the origin of scrap and shows how it is processed into a raw material. 48¢. Available Pittsburgh Chapter, Institute of Scrap Iron & Steel, Inc., 2325 Koppers Bldg., Pittsburgh 19, Pa.

"Metalworking With Wax." 16 mm color and sound movie, 25 min. Describes the properties of wax as well as its functions in the metalworking process. Available from Johnson's Wax Industrial Products Dept., Racine, Wis.

"The Story of Light." 10-min. color and sound picture, 16 mm non-theatrical and 35 mm for theatrical use. Salutes the 75th anniversary of the invention of the first practical incandescent light by Thomas A. Edison. Tells the story of man's efforts to combat darkness. General Electric, Schenectady 5, N. Y.

"The Builders." 16 mm sound and color film. 31 min. Story of man's struggle to build bigger, higher and better. Welded wire fabric steel reinforcement is featured. No charge except transportation. Modern Talking Picture Service, Inc., 45 Rockefeller Plaza, New York 20.

important LINK in AUTOMATION



A step toward automation is equipment for faster, less costly handling of heavy materials; cranes, custom designed for specific applications. Conco engineers can design such cranes — the right lift, the right speed, the right clearances. Thirty seven years experience are behind every Conco Crane recommendation. Request a Conco representative to call and discuss your problem. Or, write for Bulletin 3000A covering the complete Conco Crane line.

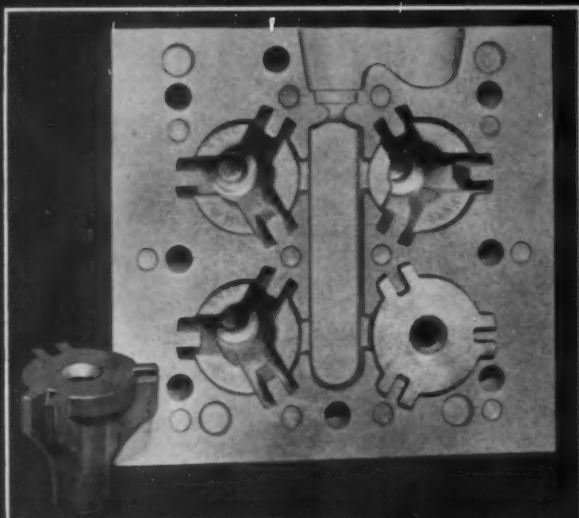


CONCO ENGINEERING WORKS
Division of H. D. Conkey & Company
15 Grove St., Mendota, Illinois

AFFILIATES:
Conco Engineering Works - Domestic Heating Equipment
Conco Building Products, Inc., Brick, Tile, Stone

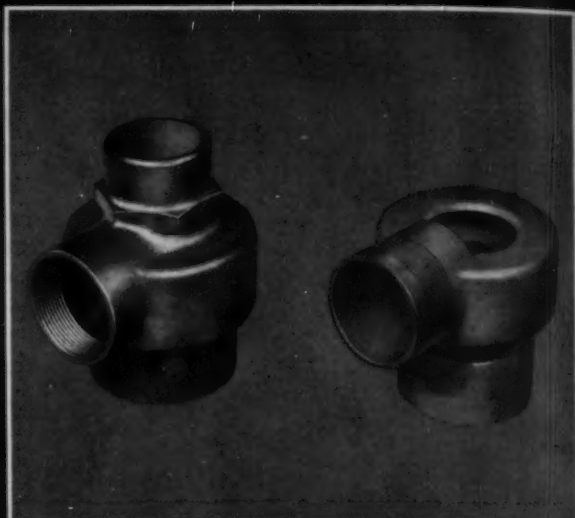
RESINOX

FOR SHELL MOLDS



Resinox gives this deep-draw shell mold the vertical strength required, yet precision castings come out clean, need little if any finishing.

FOR SHELL CORES



Shell cores, made with Monsanto resins, have cold strength to withstand rough handling yet shake out easily. Note fine reproduction of thread detail.

Cuts casting costs from the inside out

Report after report from some of the nation's major foundries prove that there are important differences in foundry resins, and that Monsanto resins save man-hours, cut finishing costs and practically eliminate the reject problem.

Resinox foundry resins produce shells and cores with good dimensional stability for close tolerance work, high hot strength, penetration resistance and collapsibility — all prime areas

Resinox: Reg. U. S. Pat. Off.

where resin quality is the key to cost control.

You can cut production costs and build quality into your castings from the inside out by using Resinox resins for shell molds and shell cores.

For full information on Monsanto's quality line of foundry resins for shell molding, core binding and sand conditioning, write today to MONSANTO CHEMICAL COMPANY, Plastics Division, Room 5910, Springfield 2, Mass.

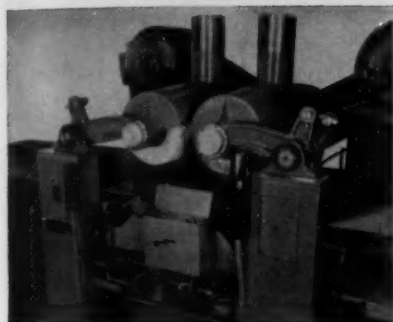
Meet more Monsanto products
on CBS-TV "Morning Show"

MONSANTO

SERVING INDUSTRY . . . WHICH SERVES MANKIND

NEW EQUIPMENT

**New and improved production ideas,
equipment, services and methods
described here offer production
economies...for more data
use the free postcard on page 115 or 116**



Tandem roll polisher handles extrusions, sheets

Electro-hydraulic controls, hydraulic contour device for automatically following the contours of shaped pieces, and the tandem roll feature of this horizontal polishing machine permit rough cut, or cut-down, and finishing at only one work setup. The machines are designed to handle extrusions of all types, sheets, plates, rods, tubing

and odd-shaped items. Polishing rolls are powered by motors of ample capacity. Stroke is from 2 in. to full capacity of the machine in stepless increments. Work or fixture-table is available in any width or length depending on work to be finished. Table may be oscillated. *Central Machine Works.*

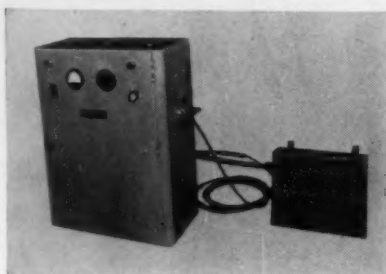
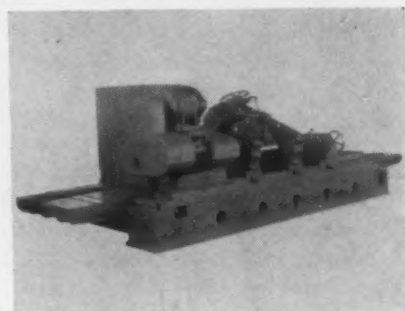
For more data circle No. 31 on postcard, p. 115.

Roll grinder is made to swing 36-in. diam work

Rolls weighing up to 25,000 lb can be handled on this new roll grinding machine. In operation, the wheel is traversed across the face of the roll and crowning and concaving can be done to precision limits. In addition, a swivel table under the work head and footstock permits grinding of tapers. Tra-

verse of the wheel head is variable from 2 to 100 ipm. Work speeds of the headstock are variable 12 to 100 rpm. All operating controls are located at a central station aside of the grinding wheel where the operator has a seat. *Landis Tool Co.*

For more data circle No. 32 on postcard, p. 115.



Ultrasonic generators speed normal cleaning jobs

Construction of larger and more flexible industrial cleaning equipment is possible with a new high-powered multi-crystal ultrasonic generator. This new generator with its greater power, makes it possible to design ultrasonic cleaning tanks which can take larger

parts, or which can be used for mass-production, continuous-process cleaning of small parts. The two units of the generator consist of the power oscillator and the transducer assembly. *General Electric Co.*

For more data circle No. 33 on postcard, p. 115.

Spot welder uses filler metal for stronger welds

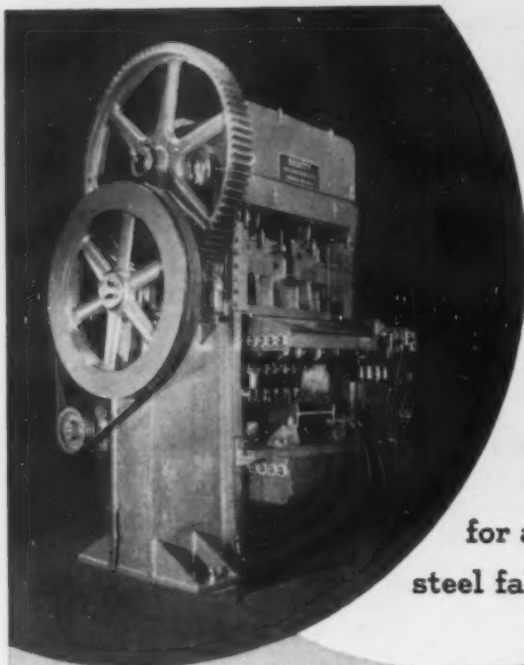
A manual sigma spot-welding process makes spot, plug, and tack-welds with the addition of reinforcing filler metal. The process makes extra-strong welds in heavier metals and requires access to only one side of the weld joint. This inert gas shielded welding process feeds consumable wire electrode automatically into the weld area. The filler metal makes a 100 pct penetration in the lapping metals.

Spot welds are made quickly and easily on metals up to $\frac{1}{8}$ in. thick, in a horizontal or vertical position. The operator merely positions the nozzle of the pistol-type torch on the work and pulls the trigger. Current, water, and argon flows start and shut off automatically. Welds are uniform and smooth, requiring little or no costly finishing operations. *Linde Air Products Co.*

For more data circle No. 34 on postcard, p. 115.

Turn Page

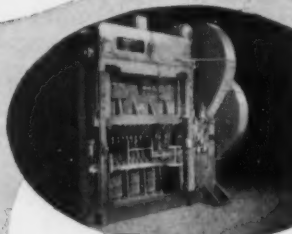




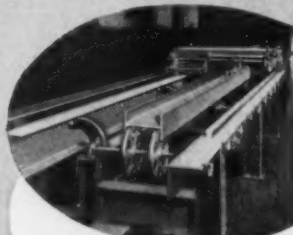
This Beatty Punch CUT COSTS 75%

for a structural
steel fabricator

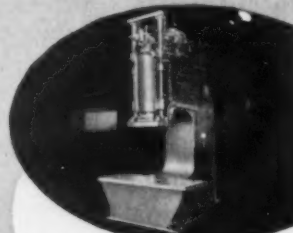
One of our present-day satisfied customers formerly employed machinery using only one punch for punching structural steel shapes. After consulting a BEATTY engineer, this firm installed a BEATTY Guillotine Beam Punch with an adjustable tooling feature that enables them to perform exact repeats of multiple punch patterns in 25% of the time formerly required. Naturally, we can't guarantee such substantial savings in every industrial installation of BEATTY machines! But, if you're currently considering additional production machinery for your metal fabricating plant, better see a BEATTY engineer before making any final decisions! Chances are he'll have an idea or two on how you can achieve greater production economies with BEATTY Machines!



BEATTY Guillotine Beam
Punches are available for
punching webs and
flanges in "I" beams
from 6" to 30".

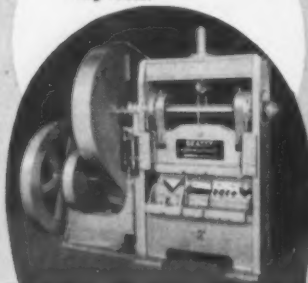


BEATTY Spacing Table handles web and flange punching without roll adjustment.



BEATTY Gap Type Press for forming, bending, flanging, pressing. Capacity 250 tons.

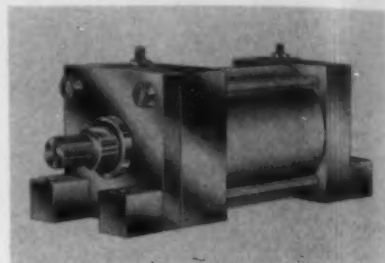
BEATTY
Guillotine Bar Shear
for angles, bars, rounds,
squares without changing tools.



B E A T T Y
Machine & Mfg. Company
HAMMOND, INDIANA

Cylinder mounting

New cylinder mounting consists of sturdy, thick, square mounting lugs that mount flush with Miller's standard heads and caps and provide a space-saving mounting of strength and rigidity. It is for



side or foot mounting. Mounting lugs are easily and quickly installed and detachable for interchangeability with other Miller attachments. Its lower centerline height is precision machined to a tolerance of 0.002 in. Model 77 is available in Miller's complete line of custom-built cylinders. *Miller Fluid Power Co.*

For more data circle No. 35 on postcard, p. 115.

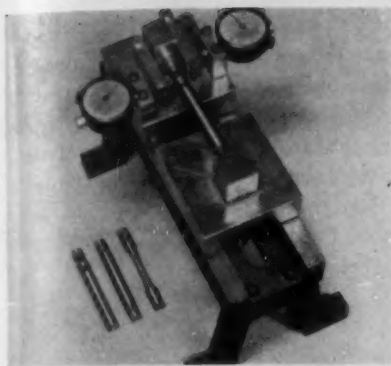
Gear testing fixture

With a new holding fixture, gears may be quickly and accurately tested on the pitch line of gear teeth. Designed for use on a Rock-



well Superficial Hardness Tester with a special gooseneck type Brale, this quick-change device will accommodate gears of various sizes in a laboratory or production operation. Test cycle can be completed in seconds. *Wilson Mechanical Instrument Div.*

For more data circle No. 36 on postcard, p. 115.



Assures production of close tolerance specimens

A new inspection fixture is announced for checking the taper and concentricity of specimens to be tested in the R. R. Moore high speed fatigue testing machine. The fixture assures production of specimens to dimensional tolerances close enough to prevent vibration during tests, and minimize testing machine maintenance. It can be used to set up a lathe or grinder

for making the tapered ends of specimens to the required accuracy. Two dead centers, one attached to the base and one a movable carriage, provide for holding and rotating specimens. Two dials are used to compare known taper of a comparison gage with taper of specimen, and measure its eccentricity. *Baldwin-Lima-Hamilton Corp.*

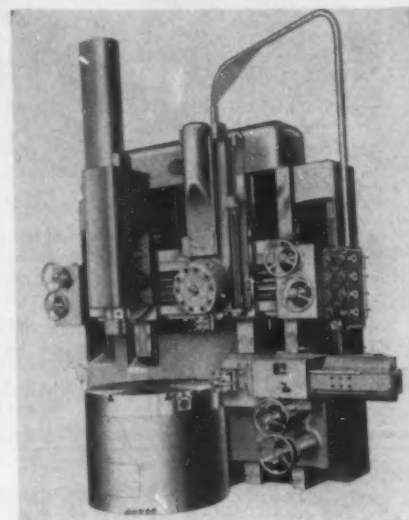
For more data circle No. 37 on postcard, p. 115

New lathe design meets production, efficiency needs

Advantages such as massiveness, rigid construction, wide range capacities and versatility of pendant control are combined in the new Bullard Cut Master vertical turret lathes. Model 75 is built in six sizes in increments of 10 in., ranging from 26 to 76 in. table diameters. Movable pendant control enables the operator to select all operational functions of the machine from a single station. Headstock feed works and hydraulic shifter units are assembled integrally within the bed to operate as one compact drive unit. Table speed

has been increased for efficient cutting of the lighter metals. Turret head consists of saddle, swivel, turret slide and 5-sided turret. Side head is capable of vertical and horizontal cutting operations simultaneously with those performed by vertical heads. All drive units and shafts are enclosed as a protection to both machine and operator. Added operational versatility is possible through the application of optional equipment such as angular turning, thread cutting-drum scoring. *Bullard Co.*

For more data circle No. 38 on postcard, p. 115.



Low-lift Walkie electric truck handles heavy loads

With capacities to 16,000 lb, these low-lift Walkie electric trucks are built with an articulated frame which permits the use of stabilizing casters on the load-carrying frame of the truck. The driving portion of the truck and the battery are hinged to the load-carrying frame by a parallel linkage so the weight of the load is distrib-

uted over the four rear wheels and two large casters for the utmost floor protection. An electro-hydraulic lift of 4 in., with lowering action, is controlled from the handle head. Platform size is 48 in. long x 25 in. wide. Truck will right angle turn in 89-in. aisles. *Lewis-Shepard Products, Inc.*

For more data circle No. 39 on postcard, p. 115.



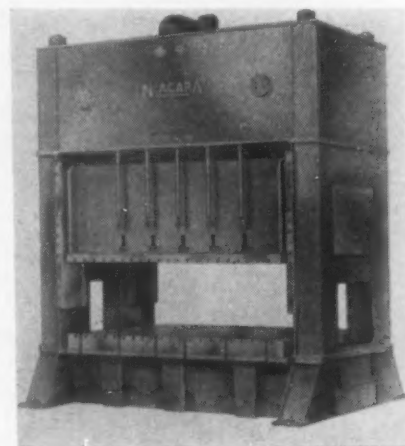
Streamlined presses for large, heavy tonnage work

Designed to handle a tremendous variety of large, heavy tonnage drawing, punching and blanking work, a line of straight side eccentric geared presses has been produced with one, two and four point suspension, covering a range of 100 through 1000-ton capacities. Series SE presses are described as practical and dependable for work requiring large die areas; heavy tonnage demands; long stroke, deep drawing jobs where work is engaged high up on the stroke and

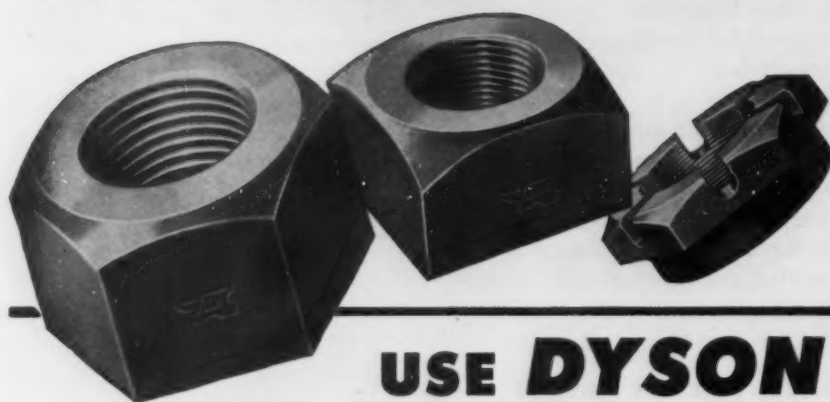
bottom-of-stroke blanking and punching. The crankless eccentric drive reportedly delivers greater torque with less deflection than is possible with other types of construction. Frames are rugged, all-steel, four-piece, tie-rod construction. Entire driving assembly is housed in the crown. Operating controls provide maximum protection for operator and press. *Niagara Machine & Tool Works.*

For more data circle No. 40 on postcard, p. 115.

Turn Page



FOR YOUR **LARGE** FASTENERS



USE **DYSON**

FLAT DIE FORGED NUTS!

Carbon or Alloy Steel... Regular Standards Carried in Stock... Prompt Service On Special Requirements... Starting Size...

2 3/4" Thru 12" Bore Size... For Marine Service, Railroads, Large Presses, Engines, and Large Machine Equipment...

Hex - Square - Round

Heavy, Regular, Full, Half, Jam, Sleeve, Mechanic's, Castle, Jack, and Slotted Nuts... Also Large Nuts to Your Engineered Spec-

ifications... Adequate Steel Stocks, Machining and Heat Treating Facilities Assure Prompt Service...

Write, Wire or Phone:



JOSEPH DYSON & SONS, INC.

5125 ST. CLAIR AVENUE

CLEVELAND 3, OHIO

Phone NE-1-6157

NE-1-6158

GET THE FACTS on WELDIT **SUPERIORITY!**



HISTORY OF WELDING

Roman artificers working at a primitive anvil, welding a sword handle to a blade by the Fusion Method of welding. The early Romans were gifted in this art several centuries before Christ.

- 36 years experience in manufacturing fine welding equipment.
- Modern designing by top-flight welding engineers.
- Constant laboratory and production tests assure high efficiency and low operating costs.
- Thousands of users throughout the world have, for years, used Weldit torches for every welding requirement.
- Originators of the famous Weldit Weldimatic torch and the Weldit Gasaver.



**WELDIT
BLOWPIPE**

The new Weldit Weldimatic Blowpipe fabricated of special aluminum alloy, combines advantages that appeal to every welder.

The C-47-W features light weight, less operator fatigue, increased capacity, more economy. The pilot automatically relights blowpipe when lever is pressed. Built to close engineering standards, plungers are of stainless steel, special design provides constant tension on pilot adjustment. Write for descriptive folder.

Canadian Distributor:—Alloy Metal Sales
181 Fleet St., E., Toronto 5, Ontario, Canada

Weldit
INC.
SINCE 1918

**990 OAKMAN BLVD.
DETROIT 38, MICHIGAN**

NEW EQUIPMENT

Wound-rotor motor

A rib-type enclosed, fan-cooled wound-rotor motor is made with slip rings, brushing rigging, rotor and stator inside a single frame enclosure. The first A-C explosion-proof wound-rotor motor to bear the Underwriters' Laboratories label, the unit is available at 1800



rpm and slower speeds, in frames 284 to 505, in standard enclosed or explosion-proof construction. In general, the new motor is applicable where very low starting current, high starting torque, smooth acceleration, jogging or variable adjustable speed dictate the use of a wound-rotor and where moist, dirty, corrosive, or hazardous atmospheres require a totally enclosed motor. *Allis-Chalmers Mfg. Co.*

For more data circle No. 41 on postcard, p. 115.

All-weather cab

An all-weather cab permits Buda gasoline and Diesel powered pneumatic tired, 6000-lb capacity, fork lift trucks to operate efficiently and economically all year round regard-



less of weather conditions. Features include full driver visibility, safety glass installed throughout, adjustable door windows for better ventilation, entry from either side of cab, electrical windshield wipers, and tinted plexiglas overhead window. Heater and defrosters are optional equipment. *Buda Co.*

For more data circle No. 42 on postcard, p. 115.

For Stampings
...look for the **PLUS**
beyond
the **PRICE!**



Ever think how much time good quick service saves you and other key men in both office and plant?

Excellent service — proved every business day for 39 years — is another of the many plusses you get when you buy Detroit stampings. Look for the Plusses *beyond* the price the next time you buy stampings!

*And be sure to try **DETROIT***

DETROIT STAMPING COMPANY



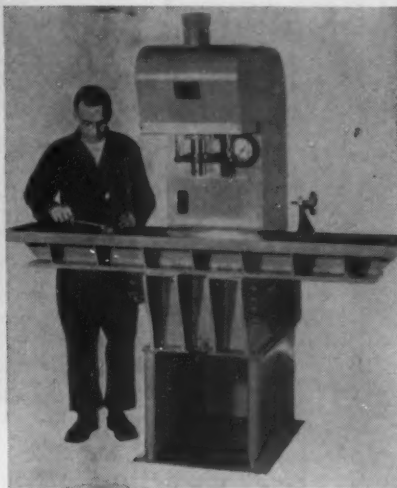
345 Midland Ave. Detroit 3, Mich.

"America's Best-Known
Jobbing Stampings Manufacturer"

NEW EQUIPMENT

Two machines in one

By replacing one quick-change table with another the Holme's hydraulic press will do either forcing or straightening, depending on the table used. And the switch can easily be made in a matter of minutes. Interchangeable manifold has only four connections, and is held in place by 4 bolts. Use of O-ring gasket-mounted valves is said to eliminate the need for conventional pipes. Instead, oil flows



through the drilled manifold plate. Swing-out motor and pump panel gives quick accessibility for inspection, maintenance, or service. Illumination is built-in and adjustable. *Stanley H. Holmes Co.*

For more data circle No. 43 on postcard, p. 115.

Screw-lock insert

New locking fastener designated as the screw-lock insert is a companion product to the wire thread insert. Three functions are performed by the new insert: it automatically locks the screw so that it is vibration-proof, ending the need for lock washers, locking wires or lock nuts; it provides a high-strength thread in materials of all kinds; and it automatically locks itself into the parent material without the use of pins, rings, staking, etc. Shown is the new screw-lock insert with square tang which, after installation, forms the constricting area which grips the screw. *Heli-Coil Corp.*

For more data circle No. 44 on postcard, p. 115.

Turn Page

Fast Delivery



Quality

SIMONDS
INDUSTRIAL
CUT GEARS

- ★ FINISHED GEARS
- ★ CUSTOM GEAR CUTTING
- ★ HEAT-TREATED, CASE OR FLAME-HARDENED

You are sure of quality and prompt service when you place your industrial cut gear requirements with SIMONDS GEAR. We produce the full range of sizes in the types and materials you need from your blanks or ours. Let us quote on your next gear requirements.

* * *

Stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

SPUR GEARS
BEVEL GEARS
MITRE GEARS
WORMS • WORM GEARS
RACKS • PINIONS
Cast or forged steel,
gray iron, bronze,
Meehanite, rawhide
or bakelite



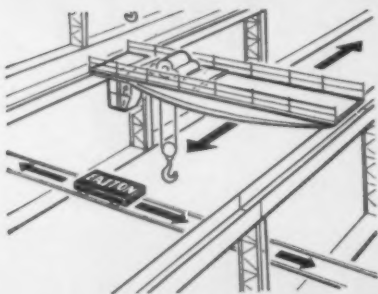
THE SIMONDS
GEAR & MFG. CO.

LIBERTY at 25TH PITTSBURGH 22, PA.

Quality Gears for over 60 years

Cross-Bay Transfer

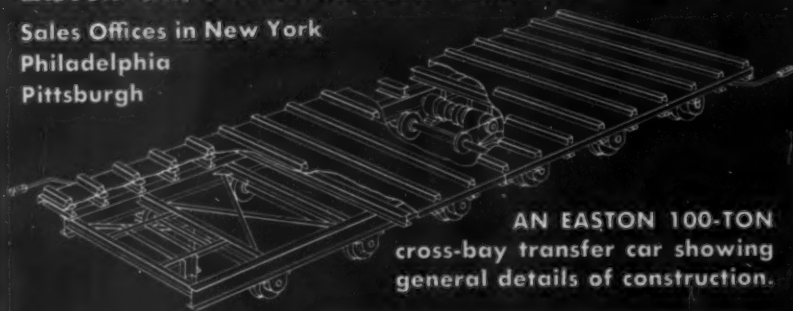
TRADE MARK



The EASTON motorized cross-bay transfer car is designed to provide lateral handling of materials to supplement overhead crane service in modern multiple bay plants. The cross-bay movement of the automatic transfer car provides a universal handling system able to spot a load anywhere on the floor of the plant. The same car system may also be used for moving materials between plant buildings.

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

Sales Offices in New York
Philadelphia
Pittsburgh



AN EASTON 100-TON cross-bay transfer car showing general details of construction.

EASTON

A-1046

PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES

1-TON	\$ 552
2-TON	\$ 627
5-TON	\$1,286
8-TON	\$1,581
10-TON	\$1,855
25-TON	\$3,681

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

DELIVERY FROM STOCK

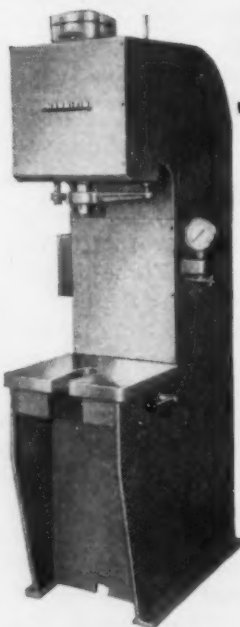
Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.

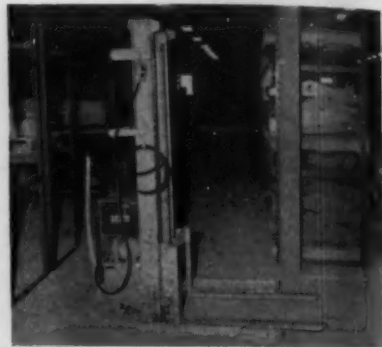
HANNIFIN

HANNIFIN CORPORATION, 513 S. WOLF ROAD, DES PLAINES, ILLINOIS



Battery powered stacker

The Raymond pallet stacker is now offered with a 12 v battery operated lifting motor and automatic built-in charger. Two 6 v, 125 amp-hr batteries are wired in series to provide the 12 v current. Batteries can be charged during off duty use to keep the unit ready for full 8-hr



shift operation. The stacker can lift and stack 2000 lb pallet loads. Adjustable base forks will straddle all popular size pallets. Lifting forks are adjustable in width and come in 36 or 40 in. lengths. The stacker is positioned manually and a fifth wheel steering arrangement provides exceptional maneuverability. *Raymond Corp*

For more data circle No. 45 on postcard, p. 115.

Squatty impact wrench

Designed to handle hard-to-get-at production and maintenance jobs, the wrench is only 8½ in. high with a spindle offset of 2⅞ in. Its flat back enables the operator to place his chest or shoulder behind



the wrench. In seconds it can remove big nuts and bolts, though frozen or stripped. Of aluminum alloy construction, the wrench weighs 19¾ lb and delivers 1800 impacts per minute. *Mall Tool Co.*

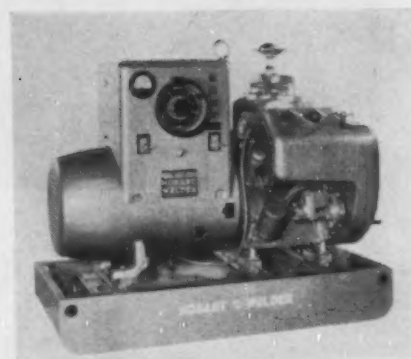
For more data circle No. 46 on postcard, p. 115.

Combination power plant and arc welder

An ingenious selector panel in conjunction with a standard control panel makes this ac arc welder-ac power plant a most versatile power unit. By removing only two wing nuts the selector panel can be moved to any one of three locations to provide 60 to 80 volts for welding, 110 v power, or 220 v power. After the selector panel is moved to the desired output marked on name

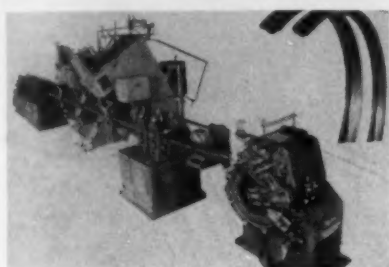
plate the unit automatically provides the proper current characteristics for that purpose. When used as a power unit, the generator will provide 110-v, single phase, 2-wire, 60 cycle ac or 220/110 v, single phase, 3-wire, 60 cycle ac. Power factor is 80 pct. When used as an arc welder it makes available 60 to 80 v ac. *Hobart Brothers Co.*

For more data circle No. 47 on postcard, p. 115.



Bicycle rim mill

Tooling on this bicycle rim mill is for two types of rims. Strip is taken from a coil box to a slitting unit where the stock is edge trimmed to size, then coldroll formed into the bicycle rim contour. The formed rim then passes through the welding unit com-



pleted of three Taylor-Winfield seam welders, where it is welded at the joint. From the welders the section goes through a sizing unit and into an automatic bending and cutoff machine. This machine circles and cuts off the formed sections into individual rims. Material is SAE 1010 strip and production is 35 fpm. *Kane & Roach, Inc.*

For more data circle No. 48 on postcard, p. 115.

Manganese bronze rod

Mang-Trode, a new covered manganese bronze electrode has been announced for high speed metal-arc welding of manganese bronze and yellow brass castings and sheet and plate. These electrodes operate at relatively high current densities on reverse (positive) polarity, dc for fast deposition. Arc action is smooth and spatter losses are very low. Mang-Trode can be applied at room temperature without excessive preheat and interpass temperatures. *Ampco Metal, Inc.*

For more data circle No. 49 on postcard, p. 115.

Cowles DRYORTH*

Anhydrous Sodium Orthosilicate
High-powered Cleaning at Low Cost

• Cowles DRYORTH is free-flowing, granular, dust-free. It contains not less than 60% Na_2O and is quickly and completely soluble.

DRYORTH is a fast, economical cleaner for

- ★ strip and sheet steel
- ★ steel pipe — before galvanizing
- ★ heavy ferrous parts and castings

Try DRYORTH for these and other basic cleaning operations. DRYORTH — anhydrous sodium orthosilicate — assures long cleaning mileage at low cost.

*Reg. U. S. Pat. Off.

Cowles also manufactures a complete line of cleaners engineered to handle all kinds of cleaning problems on both ferrous and non-ferrous metals. The Cowles Technical Man in your area will be glad to discuss any metal cleaning problems you have. Write us today!

**COWLES
CHEMICAL
COMPANY**

7016 Euclid Avenue
Cleveland 3, Ohio

STEEL...one piece or a truckload



**Delivered where you want it
... when you want it**

Sure we like big orders—and we handle them easily, every day, because our stocks are the world's largest, our cutting and handling facilities unsurpassed. But our business depends on small orders as well, and you'll find we never lose sight of this fact. Whether you want one bar or a thousand—one sheet or many tons, you'll get courteous service—quick delivery. Dependable, certified quality, too. Call us and see.

JOSEPH T. RYERSON & SON, INC.

RYERSON STEEL

Principal products in stock: Bars, structurals, plates, sheets, tubing, alloy steel, stainless, re-bars, etc., also machinery & tools

PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT • BUFFALO
PITTSBURGH • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY . . .

Production scheduled at 80 pct of capacity despite Thanksgiving holiday . . .

Pickup in demand continuing to show on most products.

Recovery . . . Steel business looks better this week than it has at any time during the past year. Here are the highlights:

- The industry is operating at 80.0 pct of rated capacity.
- New orders are coming in at an extremely fast clip.
- Order backlogs are growing rapidly, causing deliveries on most products to become more extended.
- And cancellation is practically a forgotten word.

Strong recovery is now being felt in nearly all finished steel products. The scintillating rise in cold-rolled sheet demand, perhaps the most spectacular part of the recovery, is putting additional pressure on other flat-rolled products. But hot-rolled sheets and hot and cold-rolled strip are showing solid improvement in their own right.

Distribution . . . Far-reaching extent of the recovery is indicated by recent sharp improvement in demand for hot-rolled carbon bars. Improvement in this product is important because it has been lagging badly.

Plate sales are getting a strong lift from

the construction equipment industry which is looking ahead to highway construction needs for next year. Woven wire fabric, which was already selling very well, is moving on more extended delivery.

Hotbeds of demand are along the great steel consuming axis of Chicago-Detroit. Automotive firms are spurring demand in the Detroit area as auto companies gear production schedules up to record levels.

Strong appetite for steel in the Chicago area is being reflected from many sources. Farm equipment buying is much stronger than had been anticipated.

Allocation . . . Neither steel producers nor very large consumers appear to be worried about a shortage of cold-rolled sheets. But their confidence is not reflected by medium-sized and small consumers who are attempting to place orders far in advance of actual needs.

Mills have adopted an informal system of allocating sheets to their customers. In many cases space is being held open on the order books to take care of large customers whose needs can be fairly well anticipated although they are relatively slow in making firm commitments for tonnage.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	1,890	1,892	1,776	1,956
Ingot Index (1947-49=100)	117.7	117.8	110.6	121.8
Operating Rates				
Chicago	87.5	85.0*	78.5	95.0
Pittsburgh	77.0	75.0	73.0	80.0
Philadelphia	70.0	70.0	64.0	91.0
Valley	78.0	78.0*	70.0	90.0
West	79.0	81.5*	82.0	89.5
Detroit	88.0	88.0*	99.0	89.0
Buffalo	97.5	97.5	87.5	99.5
Cleveland	80.5	80.0*	82.0	92.0
Birmingham	64.5	63.5*	71.0	96.5
S. Ohio River	88.0	85.0	85.0	77.0
Wheeling	82.0	97.0*	86.0	76.0
St. Louis	82.0	84.0	84.0	99.0
East	66.5	68.0*	46.0	89.0
Aggregate	80.0	79.5*	75.0	88.5

* Revised. † Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.797	4.797	4.798	4.632
Pig Iron (gross ton)	\$56.59	\$56.59	\$56.59	\$56.59
Scrap, No. 1 hvy (gross ton)	\$32.83	\$33.83	\$33.33	\$34.83
Nonferrous				
Aluminum, ingot	22.20	22.20	22.20	21.50
Copper, electrolytic	30.00	30.00	30.00	29.75
Lead, St. Louis	14.80	14.80	14.80	13.30
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	90.75	91.50	92.375	86.25
Zinc, E. St. Louis	11.50	11.50	11.50	10.00

Inventory Buildup Begins

**Current demand upsurge plus reversal of year-long inventory cutback trend is giving market a new look . . .
Most products strong and getting stronger.**

♦ **STEEL CONSUMERS** are now impressed. The die-hards who were skeptical about the strength of the market are moving in and placing orders as far ahead as first quarter.

In addition to current demand, the market has the added push of inventory-building. This was expected by old heads who realize that inventories are seldom static. They either move up or down. They're now moving up on just about all products.

The sheet market, both hot and cold, is extremely strong. On cold-rolled, orders at a few mills are booked through first quarter. Detroit, which had been dragging its heels on first-quarter business, is snapping to attention. Big automakers are booking sheets for January. The fever is bound to spread to others in automotive.

Name your product, the demand either is strong or moving up. If not, the potential is there, and producers, at least, know it.

Plates, which have been relatively weak, are almost certain to pick up later this year or early next. The reason: pipeline contracts. They've been held up to time completion with expected use next fall. Plates could become a strong market with or without railroad business.

Bars, both hot and cold-finished; alloy, galvanized, strip, stainless, structurals, oil country, standard pipe, wire—all have elements of strength that contribute to overall tightness of the market.

SHEETS AND STRIP . . . Chicago, one mill sold through first quarter and another booking into February on cold-rolled sheets; hot-rolled sheets on 4-week delivery at one mill. East — cold-rolled sheets 6-7 weeks. Detroit — automakers

booking into first quarter on sheets; strip improving. **Cleveland**—has not yet felt first-quarter ordering by automotive consumers, but pressure from other markets is growing. **Pittsburgh**—sheet producers are struggling to preserve some order; a happy compromise among different consumers. It's not easy.

STRUCTURALS . . . Overall, the market is holding steady. Seasonal factors not as much an influence as in previous years. Wide-flange better than standards. Good road and bridge demand.

PIPE AND TUBING . . . Despite strong competitive conditions and inventory reduction, the market is good on oil country goods. Construction is sustaining demand for standard pipe. Mechanical tubing is still reported to be listless.

BARS . . . Chicago—hot-rolled and cold-finished moving up under impetus of demand from automotive, appliances, farm equipment, and warehouses; still on 2-3 week delivery. **Detroit**—carbon bar demand brisk; one mill reports November as best shipment month since March 1953; alloy bars suffering from trend to heat-treated carbon bars, castings or stamped parts as substitutes. **West Coast** market may be softening. In the

East, an upturn. In Pittsburgh, slow improvement in carbon bars, a definite pickup in alloy.

STAINLESS . . . Demand is moving up slowly but steadily as automotive consumers place orders. Some mills foresee a tight market eventually, but that may be some time off.

PLATES . . . Demand is improving, but slowly. The mild upturn seems to be based on (1) better demand from tank fabricators, and (2) hedge buying against an anticipated improvement in line pipe demand. The line pipe market could break loose at any moment because some big projects which have been held back temporarily are likely to get underway early next year. The signs are beginning to show in several producing centers. If railroad buying were to pick up the plate market could tighten up fast, trade sources believe.

WIRE . . . In **Chicago** the market is strong, including rod, manufacturing wire and nails; springs also advancing; fasteners moving up steadily. In **Cleveland**, there's some forward buying into December and January, principally from industry including automotive; agricultural demand off seasonally and warehouses cutting inventories. Manufacturers wire continuing up in the **East**, but nails and merchant products are off. In **Pittsburgh** it's like this: merchant wire off, manufacturers wire strong; construction products unexpectedly good; fine wire at 50-75 pct of capacity but likely to improve due to automotive, tire upsurge.

ALLOY . . . New orders for alloy steel are increasing at a slow but steady rate. Recent defense contract obligations are expected to help the alloy market, but alloy steels haven't gotten the lift that had been expected from the automotive industry. One explanation may be that automotive engineers are designing treated carbon steel into applications formerly using alloy.

WAREHOUSE . . . The pickup has been relatively mild. But recent experience of **Chicago** distributors may be the forerunner of better things to come. Chicago area warehouses are back into the market for virtually every product, including cold finished bars, galvanized sheets, hot and cold rolled sheets, special alloys and strip. Situation in other districts is not as encouraging, although improving.

Purchasing Agent's Checklist

SHEETS: See capacity cold-rolled production by year's end . . . p. 59

CHRISTMAS: 1954's Yule business expected to set record . . . p. 67

MARKETS: Southern California is fastest area . . . p. W-10

STEEL: Western states capacity up 337 pct since 1936 . . . p. W-33

Comparison of Prices

(Effective Nov. 23, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.
Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Nov. 23 1954	Nov. 16 1954	Oct. 26 1954	Nov. 24 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.82	5.513
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stainl's C-R strip (No. 302)	41.50	41.50	41.50	41.50
Tim and Ternplate: (per base box)				
Timplate (1.50 lb.) cokes	\$9.05	\$9.05	\$9.05	\$8.95
Timplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. ternes	7.85	7.85	7.85	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.15¢
Cold-finished bars	5.40	5.40	5.40	5.20
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40
Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	\$4.45	\$4.45	\$4.45	\$4.325
Light rails	5.35	5.35	5.35	5.20
Semifinished Steel: (per net ton)				
Re-rolling billets	\$64.00	\$64.00	\$64.00	\$62.00
Slabs, re-rolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75
Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.798¢	4.632¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Nov. 23 1954	Nov. 16 1954	Oct. 26 1954	Nov. 24 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$61.19	\$61.19	\$61.19	\$61.19
Foundry, Valley	56.50	56.50	56.50	56.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	56.00	56.00	56.00	56.00
Malleable, Chicago	56.50	56.50	56.50	56.50
Malleable, Valley	56.50	56.50	56.50	56.50
Ferromanganese, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
‡ 74-76 pct Mn base.				

Pig Iron Composite: (per gross ton)				
Pig iron	\$56.50	\$56.50	\$56.50	\$56.50

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$32.50	\$35.00	\$34.50	\$36.50
No. 1 steel, Phila. area	32.50	33.00	32.00	34.50
No. 1 steel, Chicago	33.50	33.50	33.50	33.50
No. 1 bundles, Detroit	27.50	27.50	26.50	28.50
Low phos., Youngstown	34.50	35.50	35.50	37.50
No. 1 mach'y cast, Pittsburgh	42.50	42.50	42.50	45.50
No. 1 mach'y cast, Philadel'a.	42.00	42.50	42.50	42.00
No. 1 mach'y cast, Chicago	42.50	42.50	43.50	38.00

Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	\$32.83	\$33.83	\$33.33	\$34.83

Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$14.38	\$14.38	\$14.38	\$14.38
Foundry coke, prompt	16.75	16.75	16.75	16.75

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	29.75†
Copper, Lake, Conn.	30.00	30.00	30.00	30.125
Tin, Straits, New York	90.75†	91.50*	92.375	86.25
Zinc, East St. Louis	11.50	11.50	11.50	10.00
Lead, St. Louis	14.80	14.80	14.80	13.30
Aluminum, virgin ingot	22.20	22.20	22.20	21.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50
† Tentative. ‡ Average. * Revised.				

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on P. 105 →

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	
Birmingham R3	52.38	52.88			
Birmingham W9	52.38	52.88			
Birmingham U4	52.38	52.88	56.50		
Buffalo R3	56.00	56.50	57.00		
Buffalo I11	56.00	56.50	57.00		
Buffalo W6	56.00	56.50	57.00		
Chicago I4	56.00	56.50	56.50	57.00	
Cleveland A5	56.00	56.50	56.50	57.00	61.00
Cleveland R3	56.00	56.50	56.50	57.00	
Duquesne L3	52.50	52.50	52.50		
Duluth I4	56.00	56.50	56.50	57.00	
Erie I4	56.00	56.50	56.50	57.00	
Everett M6		61.00	61.50		
Fontana K1	62.00	62.50			
Geneva, Utah C7	56.00	56.50			
Granite City G2	57.90	58.40	58.90		
Hubbard V1			56.50		
Minnequa C6	58.00	59.00	59.00		
Monessen P6	56.00				
Neville Ial P4	56.00	56.50	56.50		
Pittsburgh U1	56.00			57.00	
Sharpsville S3	56.00	56.50	56.50	57.00	
So. Chicago R3	56.00		56.50		
Steelton B3	58.00	58.50	59.00	59.50	64.00
Swedeland A2	58.00	58.50	59.00	59.50	
Toledo I4	56.00	56.50	56.50	57.00	
Troy, N. Y. R3	58.00	58.50	59.00	59.50	64.00
Youngstown Y1			56.50	57.00	
N. Tonawanda T1		56.50	57.00		

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, 52¢ per ton for 0.5 to 0.75 pct nickel, 51¢ for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.
Silvery Iron: Buffalo, H1, \$68.25; Jackson, J1, G1, \$67.00. Add \$1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add \$1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferro-silicon prices are \$1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb., f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingot, re-rolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00		14.25
Slabs, billets, re-rolling	20.50	22.75	24.75	23.75	36.25	29.50	32.25	18.25		18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75	45.75	51.25	30.00	30.50	30.50
Sheets	41.25	41.50	48.75	43.75	62.75	50.50	59.25	34.25	41.25	34.75
Strip, hot-rolled	29.75	32.00	36.75	34.25	53.25	41.00	46.50	26.25		27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	62.75-63.00	50.50-50.75	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, J2; Baltimore, Md., I1; Middletown, O., A7; Massillon, O., R3; Gary, Ind., U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Lechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (.25¢ per lb higher) W1 (.25¢ per lb higher); New Bedford, Mass., R6.

Bar: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T5; Ft. Wayne, I4.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forgings billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

Soft Market Eases Slightly

Steady consumer pressure keeps prices at lower end of spread . . . Increased Philadelphia activity at lower prices . . . New Pittsburgh buying drops openhearth prices.

◆ DESPITE the continued upward trend of the steel operating rate, steady consumer pressure to reduce openhearth grades has kept prices soft with scattered small reductions.

A \$2 spread on No. 1 steel in Philadelphia, due to increased business at lower prices, and new buying in the Pittsburgh district at reduced levels brought THE IRON AGE steel scrap composite down \$1 per ton to \$32.83.

Market was slightly faster in Chicago with steelmaking grades holding steady at prevailing prices. Industrial grades have firmed up slightly.

Opposing the general market trend was Buffalo where steelmaking grades and blast furnace scrap moved 50¢ to \$1 a ton higher on consumer buying and dealer transactions.

Dealers in Birmingham reflect general feeling of a leveled-off market and scrap is moving more freely. Price of rerolling rails eased \$1.

Continued buying in Detroit kept prices in that center firmer than in other centers although No. 2 steel dropped \$1.

Pittsburgh . . . A last-minute purchase of No. 1 heavy melting steel by a large consumer established a price of \$33, top, off \$2 per ton. Over 5000 tons were involved in the purchase. Consumers here have been bringing in additional blast furnaces to knock down openhearth scrap prices in recent weeks. This, combined with relatively large inventories, weakened the market. Blast furnace grades are off \$1 a ton.

Chicago . . . In a slightly faster market, paced by a No. 2-bundle sale at 50¢ below the consumers previous

price, No. 1 steel-making grades continued to hold their own, pegged by small spot sales of good quality scrap at old prices. Industrial material continues to command good premium prices, and small lots have been reported at over the general market price. No. 1 heavy and No. 1 dealer bundles are moving in good quantity at \$33 but \$34 deliveries and spot purchases continue. Similarly, No. 1 heavy railroad is moving at the bottom of the spread but railroad list prices on this item continue to be strong.

Philadelphia . . . Increasing business at lower prices has resulted in a \$2 spread in several grades. Export business continues at a good pace with more ships expected in the port this week. But domestic consumers, with good stocks of scrap and not too good a production rate, have cut back their buying prices. New business also brought some grades of turnings lower.

New York . . . Dock embargo, which had taken some of the steam out of the export market and created some softness at dealer level, is expected to be lifted late this week. Only nibbles are being felt from domestic buyers. Prices are unchanged.

Detroit . . . Continued buying throughout the month maintained comparatively high prices on No. 1 grades. Strength has continued to come from local mills rather than from other markets. No. 2 grades, in contrast, are very weak, resulting in a drop of \$1 for No. 2 heavy melting. Auto plants are now generating a tremendous flow of scrap and December automotive lists, which start closing late this week, will reflect the future market.

Cleveland . . . One Valley mill was able to close a deal last week for substantial tonnage of No. 1 heavy melting at the low range of \$35 per

ton. Earlier in the week major tonnage went for \$36, indicating signs of weakness. Brokers believe this is temporary, however, and report weekly shipments still at high levels. Cleveland market remained steady with continued good shipment and no major price changes.

Birmingham . . . The steel scrap market was more stable this week and scrap was moving fairly freely. Dealers apparently have decided that prices have about levelled-off and are not holding for higher prices. Although more scrap is coming into the yards, it is not in large quantities, and dealers are accepting orders as received. Cast also was moving a little better this week.

St. Louis . . . The scrap market is awaiting results of the sale of 115 carloads embraced in the lists of two railroads closing this week. A softer tone prevails in the premium grades. Prices remain unchanged. Shipments continue to hold their own.

Cincinnati . . . Market remained in mid-month doldrums with industrial lists due next week. Auto suppliers and production foundries buying regularly but machine tool and job foundries continue to show signs of weakness.

Buffalo . . . Top quality steelmaking grades and blast furnace items edged ahead 50¢ to \$1 a ton on consumer buying and dealer transactions. Latter reported using yard stocks to cover old orders. High steel rate continues to support dealers' sentiment despite lack of new mill bidding at the present time. New sales were reported at both top and bottom of the quoted range in cast.

Boston . . . One Pittsburgh mill buying in this area has dropped its purchase price but activity from other domestic consumers as well as continuing export business is maintaining the market at earlier levels. Prices remain unchanged.

West Coast . . . Scrap continues to move at the increased pace noted after the recent price rise. No further price changes expected at least for the balance of this year except possibly Seattle. In San Francisco, no export activity this week, and cast firm with prices holding at same level. Seattle prices holding steady without much activity. Dealers feel there may be a few price changes next week.



**A SYMBOL OF LEADERSHIP
IN IRON & STEEL SCRAP
SINCE 1889**

Luria Brothers and Company, Inc.

MAIN OFFICE
LINCOLN-LIBERTY BLDG.

Philadelphia 7, Penna.

PLANTS

LEBANON, PENNA. DETROIT (ECORSE),
READING, PENNA. MICHIGAN
MODENA, PENNA. PITTSBURGH, PENNA.
ERIE, PENNA.

OFFICES

BIRMINGHAM, ALA.	DETROIT, MICHIGAN	PITTSBURGH, PENNA.
BOSTON, MASS.	HOUSTON, TEXAS	PUEBLO, COLORADO
BUFFALO, N. Y.	LEBANON, PENNA.	READING, PENNA.
CHICAGO, ILLINOIS	LOS ANGELES, CAL.	ST. LOUIS, MO.
CLEVELAND, OHIO	NEW YORK, N. Y.	SAN FRANCISCO, CAL.
	SEATTLE, WASH.	

EXPORTS-IMPORTS — LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. Cable Address: FORENTRACO

November 25, 1954

177

Scrap Prices

(Effective Nov. 23, 1954)

Pittsburgh

No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	32.00 to 33.00
No. 2 bundles	27.00
Machine shop turn.	\$18.00 to 19.00
Mixed bor. and ms. turn.	18.00 to 19.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate.	37.00 to 38.00
Heavy turnings	29.00 to 30.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	40.00 to 41.00
Rails 2 ft and under	46.00 to 47.00
RR. steel wheels	38.00 to 39.00
RR. spring steel	38.00 to 39.00
RR. couplers and knuckles	38.00 to 39.00
No. 1 machinery cast.	42.00 to 43.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	31.00 to 32.00

Chicago

No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 factory bundles	34.00 to 35.00
No. 1 dealers' bundles	32.00 to 34.00
No. 2 dealers' bundles	23.00 to 24.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	38.00 to 39.00
Low phos. punch'gs, plate.	36.00 to 37.00
Low phos. 3 ft and under	35.00 to 36.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	43.00 to 44.00
Rerolling rails	51.00 to 52.00
Rails 2 ft and under	55.00 to 56.00
Locomotive tires, cut	36.00 to 37.00
Cut bolsters & side frames	43.00 to 44.00
Angles and splice bars	43.00 to 44.00
RR. steel car axles	43.00 to 44.00
RR. couplers and knuckles	37.00 to 38.00
No. 1 machinery cast.	42.00 to 43.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	31.00 to 32.00
Cast iron brake shoes	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Malleable	43.00 to 44.00
Stove plate	32.00 to 33.00

Philadelphia Area

No. 1 hvy. melting	\$31.50 to \$33.50
No. 2 hvy. melting	29.50 to 31.50
No. 1 bundles	31.50 to 33.50
No. 2 bundles	26.50 to 27.50
Machine shop turn.	18.00 to 19.00
Mixed bor. short turn.	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Shoveling turnings	20.50 to 21.50
Clean cast chem. borings	24.00 to 25.00
Low phos. 5 ft and under	34.00 to 35.00
Low phos. 2 ft and under	35.00 to 36.00
Low phos. punch'gs	35.00 to 36.00
Elec. furnace bundles	33.00 to 34.00
Heavy turnings	29.00 to 30.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
Rails 18 in. and under	44.00 to 45.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	35.00 to 36.00
Cast iron car wheels	41.00 to 42.00
Malleable	39.00 to 40.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	41.00 to 43.00
Charging box cast.	36.00 to 37.00

Cleveland

No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 bundles	33.00 to 34.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Cut struct'r'l & plates, 2 ft & under	36.00 to 38.00
Drop forge flashings	31.00 to 33.00
Low phos. 2 ft & under	33.00 to 34.00
No. 1 RR. heavy melting	34.00 to 35.00
Rails 3 ft and under	47.00 to 48.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	27.00 to 28.00
Railroad cast.	45.00
No. 1 machinery cast.	44.00 to 45.00
Stove plate	33.00 to 39.00
Malleable	44.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$35.00 to \$36.00
No. 2 hvy. melting	23.00 to 30.00
No. 1 bundles	35.00 to 36.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	22.00 to 23.50
Cast iron borings	22.00 to 23.50
Low phos. plate	34.00 to 35.00

Buffalo

No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	26.50 to 27.50
No. 1 busheling	31.00 to 32.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	24.50 to 25.50
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. plate	34.00 to 35.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	38.00 to 39.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$27.00 to \$28.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 bundles, openhearth	27.00 to 28.00
No. 2 bundles	18.00 to 19.00
New busheling	26.00 to 27.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. punch'gs, plate.	28.00 to 29.00
No. 1 cupola cast.	34.00
Heavy breakable cast.	25.00
Stove plate	30.00
Automotive cast.	38.00

St. Louis

No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	23.50 to 24.50
Machine shop turn.	15.50 to 16.50
Cast iron borings	15.50 to 16.50
Shoveling turnings	17.00 to 18.00
No. 1 RR. hvy. melting	34.50 to 35.50
Rails, random lengths	40.50 to 41.50
Rails, 18 in. and under	47.00 to 48.00
Locomotive tires, uncut	34.00 to 35.00
Angles and splice bars	35.00 to 36.00
Std. steel car axles	36.00 to 37.00
RR. spring steel	35.00 to 36.00
Cupola cast.	44.00 to 45.00
Hvy. breakable cast.	35.00 to 36.00
Cast iron brake shoes	30.00 to 31.00
Stove plate	36.00 to 37.00
Cast iron car wheels	35.50 to 36.50
Malleable	35.00 to 36.00
Unstripped motor blocks	34.00 to 35.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$27.00 to \$28.00
No. 2 hvy. melting	24.00 to 25.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	13.50 to 14.50
Clean cast chem. borings	18.00 to 19.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	27.00 to 28.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	\$26.00 to \$27.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	33.00 to 34.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	29.00 to 30.00
Bar crops and plate	33.00 to 34.00
Structural and plate, 3 ft.	33.00 to 34.00
No. 1 RR. hvy. melting	31.50 to 32.50
Scrap rails, random lgth.	36.00 to 37.00
Rails, 18 in. and under	40.00 to 41.00
Angles & splice bars	38.00 to 39.00
Rerolling rails	41.00 to 42.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	32.00 to 33.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	35.00 to 36.00
Mashed tin cans	15.00 to 16.00

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$22.00 to \$23.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles	23.00 to 24.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	22.00 to 23.00
Elec. furnace, 3 ft & under	24.00 to 25.00
Machine shop turn.	7.00 to 8.00
Mixed bor. and short turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast chem. borings	13.00 to 14.00
No. 1 machinery cast.	29.00 to 30.00
Mixed cupola cast.	26.00 to 27.00
Heavy breakable cast.	25.00 to 26.00
Stove plate	25.00 to 26.00
Unstripped motor blocks	18.00 to 19.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$31.00 to \$32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos., 18 in. & under	36.00 to 37.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable cast.	35.00 to 36.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	\$24.00
No. 2 hvy. melting	20.00
No. 1 bundles	23.00
No. 2 bundles	18.00
No. 3 bundles	14.00
Machine shop turn.	6.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	24.00
No. 1 cupola cast.	\$43.00 to 46.00

Los Angeles

No. 1 hvy. melting	\$22.00
No. 2 hvy. melting	20.00
No. 1 bundles	21.00
No. 2 bundles	18.00
No. 3 bundles	14.00
Machine shop turn.	6.00
Shoveling turnings	9.00
Cast iron borings	9.00
Elec. furn. 1 ft and under	27.00
No. 1 RR. hvy. melting	22.00
No. 1 cupola cast.	43.00

Seattle

No. 1 hvy. melting	\$27.00
No. 2 hvy. melting	23.00
No. 1 bundles	20.00
No. 2 bundles	17.00
No. 3 bundles	13.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	\$26.00
No. 2 hvy. melting	23.00
No. 1 bundles	26.00
No. 2 bundles	20.00
Mixed steel scrap	20.00
Bushelings	21.00
Bush., new fact prep'd	20.00
Bush., new fact unprep'd	20.00
Short steel turnings	12.00
Mixed bor. and turn.	12.00
Rails, rerolling	35.00
Cast scrap	\$42.00 to 45.00

You can't beat Ohio Magnets for heavier construction

In slag reclamation or rough service—or any use where magnets are subjected to hard knocks—you need the extra heavy construction and greater lifting power of Ohio Magnets.

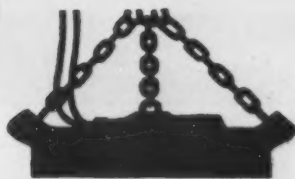
This super-strong Ohio Basket Magnet has an outer ring with integrally cast fenders that project beyond magnet diameter to ward off and protect against damaging blows. Extra heavy top plate is held in place with strong nickel-steel bolts.

For extra magnet life, extra magnet value—specify Ohio Magnets. Remember, Ohio Magnets lift larger loads longer—especially with Ohio Magnet Controllers.

Send for Bulletin No. 112. Offices in principal cities listed in Classified Directory.

Ohio gives prompt service in reconditioning and rebuilding magnets

A-7308



OHIO BOLTED MAGNETS. 12 to 65" dia. 6-coil types in 39 to 65"; 8-coil in 55 & 65". Strap coils over 39". Bolts protected in recessed wells. Also capsule-coil over 45".



OHIO WELDED MAGNETS. 39 to 65" dia. Lightweight models in 39 & 45"; 6-coil in 46, 55, 65"; 8-coil in 55 & 65". Weld on top where it can't get dented in. Also capsule-coil over 45".



OHIO BASKET MAGNETS. 55 & 65" 4-coil, & 65" 6-coil. For extra heavy-duty service. No weight carried by bolts. Also capsule-coil over 45".



THE OHIO ELECTRIC MFG. CO.
5400 DUNHAM RD. • CLEVELAND, OHIO



CHESTER BLAND
President

October Aluminum Output Up

Production at 125,089 tons just short of alltime high . . . See year's total at 1,458,000 tons . . . Copper refined stocks at new low of 32,515 tons—By R. L. Hatschek.

◆ **AVAILABILITY** of metals highlights the nonferrous news this week—in divergent directions. October aluminum production figures almost reached the alltime high set in July and stocks of refined copper held in the U. S. are at their alltime low.

For article on latest developments in magnesium, see p. 63.

Situation in copper remained pretty much unchanged—except for higher scrap prices—with producers rationing out metal to regular customers. But with production now in a rebound after the recent strike, the scarcity will slowly evaporate most industry sources believe.

ALUMINUM . . . October primary production of aluminum was 125,089 net tons, the Aluminum Assn. reports. This falls only about 1000 tons short of the alltime record set in July and tops the previous month's figure by nearly 5000 tons. Daily average production, however, was only slightly better.

Ten-month total for 1954 is 1,212,279 tons as compared to 1,036,086 tons produced in the first 10 months of 1953—a gain of just about 20 pct. With water conditions not at all bad, it is likely that November and December production will hold this rate. This will result in total 1954 primary aluminum production of approximately 1,458,000 tons or perhaps a shade better.

Testifying before the Malone subcommittee of the Senate Interior & Insular Affairs Committee, Francis C. Frary, of Aluminum Co. of America, last week urged the stockpiling of high-grade bauxite. He said this in stating that any restriction of bauxite imports would be harmful. Reason for the stockpile, despite his doubts that war would seriously disrupt supplies, is to provide a sufficient backlog of raw material to keep plants going while they are being converted to use of lower grade domestic aluminum ore.

COPPER . . . Extremely short supply pushed the copper scrap market still higher last week with consumer and dealer buying prices now quoted up to 1¢ per lb higher. Custom smelters are now offering 29¢ for No. 1 copper, 27½¢ for No. 2 and 26¢ for light copper. Ingot makers' prices for comparable grades are 28¾¢, 27¼¢ and 25¾¢ with No. 1 composition now at 23½¢. Dealer buying prices are now 26½¢ to 27¢ for No. 1, 25¢ to 25½¢ for No. 2, 23¢ to 23½¢ for light copper and a flat 21½¢ for No. 1 composition.

But the higher prices still do not seem to be bringing out significantly larger quantities of material as the consumers had hoped.

Outstanding feature of the Copper Institute statistics for October is that refined stocks in the U. S. are at their lowest level in history—only 32,515 tons. This is a decrease of 15,151 tons from the September level of 47,666 tons.

Deliveries to fabricators took a

healthy jump to 105,293 tons in October from 89,198 tons in September, partly as a result of government shipments of some 7000 tons. Refined production in the U. S. gained 4384 tons, totaling 92,258 tons, and primary crude output hit 68,521 tons for a gain of 6694 tons.

Outside the U. S. it was primary crude production that was outstanding in the statistical picture with a total of 139,656 tons as compared to 125,158 tons in September. Other features did not show any radical changes: refined production, 104,396 tons (down 3100 tons); deliveries to fabricators, 107,193 tons (down 3000 tons); and refined stocks, 177,917 tons (up 5800 tons).

LEAD, ZINC . . . Markets for the twin metals continued pretty much unchanged, showing little similarity to each other. Lead continued in London at about ½¢ above parity with the New York market while zinc continued at about ½¢ less.

On the domestic side, demand for lead remained rather light while good tonnages of zinc changed hands. Demand for zinc is coming from both diecasters and steel firms for galvanizing.

NICKEL . . . More nickel is being made available for civilian uses as a result of new reduced demands by the military. But the supply of the metal still is extremely tight. Government officials say that total nickel available for civilian uses this year may top 1953 by almost 10 pct. But they refuse to predict what nickel-hungry industries, such as the automobile manufacturers, will find when they start hunting for nickel next year.

Indications are that if the military steps up its procurement program, as has been hinted, the civilian supply will tighten again.

Bureau of Mines reports that imports are increasing. But this does not affect the civilian market, since the government stockpile has first priority.

Military and atomic energy demands for nickel, although dropping slowly, are classified by the government and not made public.

Total nickel consumption this year is expected to be 190 million lbs, compared with 211 million lbs in 1953, with the difference being taken by the stockpile. This includes both military and civilian uses. Some of the slackening in the military taken in recent months may be the result of increased use of substitutes in jets and other defense production, although this has not as yet been confirmed officially by the government.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Nov. 17	Nov. 18	Nov. 19	Nov. 20	Nov. 22	Nov. 23
Copper, electro, Conn.	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake, delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	92.00	91.625	90.75	90.75	90.75*
Zinc, East St. Louis	11.50	11.50	11.50	11.50	11.50	11.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Note: Quotations are going prices

*Tentative



*"...business helps itself
by promoting thrift
among its own people."*

EDWARD C. BALTZ

*President
Perpetual Building Association
Washington, D. C.*

"Expanding the regular sales of U. S. Savings Bonds is essential to the continued success of our Government's sound money policy. Savings Bonds help people build security for themselves and stability for the nation's economy. A reserve in Bonds gives them the assurance to spend current income on homes, cars and other substantial purchases. Meanwhile, regular Bond buying goes on adding to their future buying power. Thus business helps itself by promoting thrift among its own people. The surest way to encourage an employee to save regularly right where he works is to sign him up on the Payroll Savings Plan."

Let's point up this statement by Mr. Baltz, head of one of the nation's outstanding thrift institutions and volunteer chairman of the District of Columbia Savings Bond Committee, with a few facts and figures:

- currently, more than 45,000 companies, large and small, representing every classification of industry and business, are encouraging national thrift through the Payroll Savings Plan.
- every month, 8,500,000 Payroll Savers in these 45,000 companies invest more than \$160,000,000 in Savings Bonds.
- largely as the result of employer-encouraged thrift the cash value of Savings Bonds held by individuals on July 31, 1954, totaled more than 37.5 billion dollars.

- never before has America had such a reserve of future purchasing power.

- invested in America, these 37.5 billion dollars in Savings Bonds Dollars are a most effective check on inflation and a very important contribution to economic stability and a sound dollar.

A million new Payroll Savers by the end of 1954! That's the goal of those who believe that what is good for Americans is good for business. To do your part in reaching this objective, phone, wire or write today to Savings Bonds Division, U. S. Treasury Department, Washington, D. C. Your State Director, U. S. Treasury Department, will show you how easy it is to build a successful Payroll Savings Plan.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and

The **Iron Age**



RAILWAY EQUIPMENT FOR SALE

Used - As Is - Reconditioned

**ONE 45-TON, 340 H.P.
PLYMOUTH MODEL KC
FLEXOMOTIVE
LOCOMOTIVE**

RAILWAY CARS

All Types

"SERVICE-TESTED"

FREIGHT CAR REPAIR PARTS

For All Types of Cars

LOCOMOTIVES

Diesel, Steam, Gasoline,
Diesel-Electric

RAILWAY TANK CARS

STORAGE TANKS

6,000- 8,000- and 10,000-Gallon
Cleaned and Tested

CRANES

Overhead and Locomotive

RAILS

New or Relaying

IRON & STEEL PRODUCTS, Inc.

General Office

13496 S. Brainard Ave.
Chicago 33, Illinois
Phone: Mitchell 6-1212

New York Office

50-b Church Street
New York 7, N. Y.
Phone: BEekman 3-8230

**"ANYTHING containing IRON
or STEEL"**

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Two-Way Street . . . The shot-in-the-arm provided by stepped-up production of gleaming, new 1955 cars that has stimulated so many small and medium metalworking shops in the Midwest has turned out to be a mixed blessing.

As the Detroit assembly lines speed up on the retooled models small subcontract shops have needed different, more efficient tools. The older unwanted tools have found their way into and loaded up the market, providing another headache for dealers.

Independents Provide Boost . . .

Subcontract business in Midwest shops has had a pickup as two large independent auto suppliers have gone into action on the new model runs.

Further uplift for the small shops will come after the turn of the year when Packard, Nash and Hudson swing into full production and holders of subcontracts need extra machinery to step up their output.

Inspection Program On . . .

Ordnance Corps has started the machinery rebuilding program on a small scale. Operations are commencing in the Chicago Ordnance District with contracts to be let on the rebuilding of ma-

chinery at Joliet Arsenal and Rock Island Ordnance plant.

Ordnance Corps has started an Inspection School at Rock Island Arsenal, Rock Island, Ill., to set up standard methods of inspection of production equipment to aid rebuilders in meeting government requirements. The school is in the form of a two-week seminar. For further information those interested should write to the Commanding General, Rock Island Arsenal, Attn: Lt. Col. H. A. McKerral, PEQUO.

Inventories Up . . .

In Pittsburgh machine tool dealers have an over inventory problem. Price-cutting is a common expedient to move any equipment.

Steel mills aren't coming into the market very strongly, or are they committing themselves to anything that isn't urgently needed to maintain production. Delivery time plus reasonable price are the selling factors.

Detroit Active . . .

In the busy automobile centers the demand for late model lathes, jig borers, boring mills and the like is still holding up well. However dealers' sources are asking solid, and pretty high prices for equipment and profits are slim.

Sales Trends in Used Machinery Industry

(Based on survey* of 92 used machinery dealers)

Quarter	Composite Sales		Change	
	1953	1954	Dollar	Pct
1st	\$7,307,004	\$5,365,973	—\$1,941,031	—26.56
2nd	6,689,224	5,211,147	— 1,478,077	—22.09
3rd	5,762,310	4,365,906	— 1,396,404	—24.2
4th	5,594,725			
Total	25,353,238			

Period	Cumulative Data		Change	
	Composite Sales	Dollar	Change	Pct Change
Jan. 1, 1953-Sept. 30, 1953	\$19,758,558			
Jan. 1, 1954-Sept. 30, 1954	14,943,026	— 4,815,532		—24.4

*Study was made by Machinery Dealers National Assn. Statistics cover only dealer-to-user sales of used equipment.